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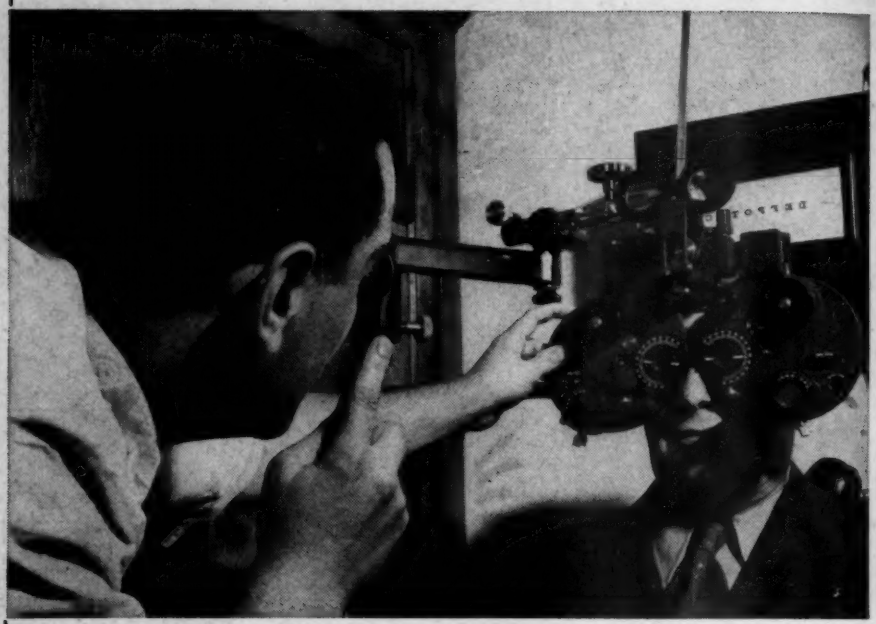

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AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 30 MAY, 1947 NUMBER 5

PIGMENTED TUMORS*

THE DE SCHWEINITZ LECTURE

ALGERNON B. REESE, M.D.
New York

GENERAL CONSIDERATIONS

Cells that produce pigment are called melanoblasts, and the pigment they produce is called melanin. Actually, we know very little about these cells and their product. For this reason, there is great difference of opinion regarding them, and those who are close to the subject and have given it a great deal of thought are reluctant to express definite concepts. Knowing full well that the whole subject is in a state of flux, and having already qualified myself to speak freely on the ground that those who know most about it will not, I shall attempt to outline the frontiers of the subject as I see them on the basis of our present knowledge. My approach will be from the neoplastic standpoint, and in this regard ophthalmologists have a great deal at stake, for their work embraces every type of pigment-bearing tumor.

The term "melanin" is a general nonspecific one applied to almost any black, brown to tan pigment. It probably includes a heterogeneous group of pigments which have the common characteristic of absorbing visible light in a somewhat uniform manner.

Morphologically the melanin pigments encountered in the eye differ. That seen in the pigment epithelium of the retina is black and composed of discrete rods, while that in the chromatoblasts of the uvea is light and appears as varying-sized, amorphous, crystalline granules. It is quite possible that it will be shown some day that the melanins produced by various types of melanoblasts differ chemically, in staining reactions, in spectral absorption, or in other ways.

It has been established, mainly through the work of Bloch,[1] that melanoblasts contain an oxidase which is specific for oxidizing "dopa" into a substance resembling melanin. According to Laidlaw,[2] this oxidase is increased wherever melanin is being produced and is the invariable precursor of melanin. Where there is no melanin produced there is no oxidase, and where there is no oxidase no melanin is produced. The oxidase appears first and melanin next and the order is never reversed. The oxidase appears in the cell sometimes before the resultant mlanin is visible, and the melanin itself may remain in the cell long after the oxidase has disappeared. As Bloch[3] has pointed out, the cells around the growing margin of a malignant melanoma are more apt to contain the oxidase than those in the supposedly less-active cells in the center.

It appears, therefore, that access to this oxidase is essential for a cell to fabricate

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melanin. It is not known whether or not the oxidase is found in the cell itself or comes from some source outside of the cell, or whether or not it acts upon the cell causing the cell to synthesize melanin, or merely promotes the conversion of a leukomelanin or premelanin substance in the protoplasm to melanin. It seems, however, that, when this oxidase is available, many cells have the potentialities of showing melanin in their protoplasm.

Sometimes a malignant melanoma is associated with generalized melanosis in which pigment is seen in the connective tissue and reticulo-endothelial cells and, rarely, everywhere over the body including the endothelium of blood vessels, and even in the parenchymal cells of organs such as the kidney and the thyroid. The question of whether this is a result of phagocytosis of pigment dispersed from the primary site of the tumor must be considered, but it seems probable in some instances that the cells have stepped out of their usual role and become true melanoblasts. Time may prove, therefore, that any cell can fabricate melanin in its protoplasm if the necessary ferment is available, and that certain cells are usually melanoblasts because this ferment is available. Its availability may evolve around the peripheral sensory nerves.

The fact that this oxidase is available and even elaborated by a pigment-producing growth leads to changes in the tissues which may be confusing both histologically and clinically. Histologically, the cells composing the tissue harboring the tumor may be converted into melanoblasts, thus clouding the histologic picture in that the cells belonging to the tumor proper may be confused with those cells belonging to the stromal elements or to the host tissue. Clinically, the elaboration of oxidase by the tumor may be significant because it serves to explain the melanosis of the tissue adjacent to the tumor or of the tissues which come into contact with the tumor. Clinical observations which bear this out are the following:

1. A nevus of the caruncle may give rise to a melanosis of the skin covering the adjacent canaliculi which come in contact with the tumor surface. Aside from the melanosis the skin is normal in appearance.

2. The conjunctiva adjacent to a nevus may show the melanosis and no other appreciable change. This may also be true of the corneal epithelium adjacent to a nevus of the limbus.

3. In an actively growing malignant melanoma of the skin or conjunctiva, the pigment halo of the adjacent skin or conjunctiva is not uncommon.

4. The café-au-lait pigmentation of the skin over the site of neurofibromatosis is a pigmentation of the basal layer of an otherwise normal skin.

5. When a nevus involves the lid margin, there may be a melanosis and even an epithelial hypertrophy of the margin of the other lid at the site where the nevus comes in contact with it.

6. Benign pigmented lesions sometimes occur on the iris in eyes harboring a malignant melanoma elsewhere in the uvea.

The appreciation of the nature of this melanosis of the tissues adjacent to, or in contact with, a pigmented lesion may assume clinical significance when such lesions are being excised. A simple melanosis, which is secondary to the product elaborated by the neoplasm, does not have to be included in the excision. This is important when the inclusion of such melanosis in the excision entails extensive plastic repairs and the sacrifice of important structures.

The process of oxidation is responsible for the appearance of melanin in the pro-

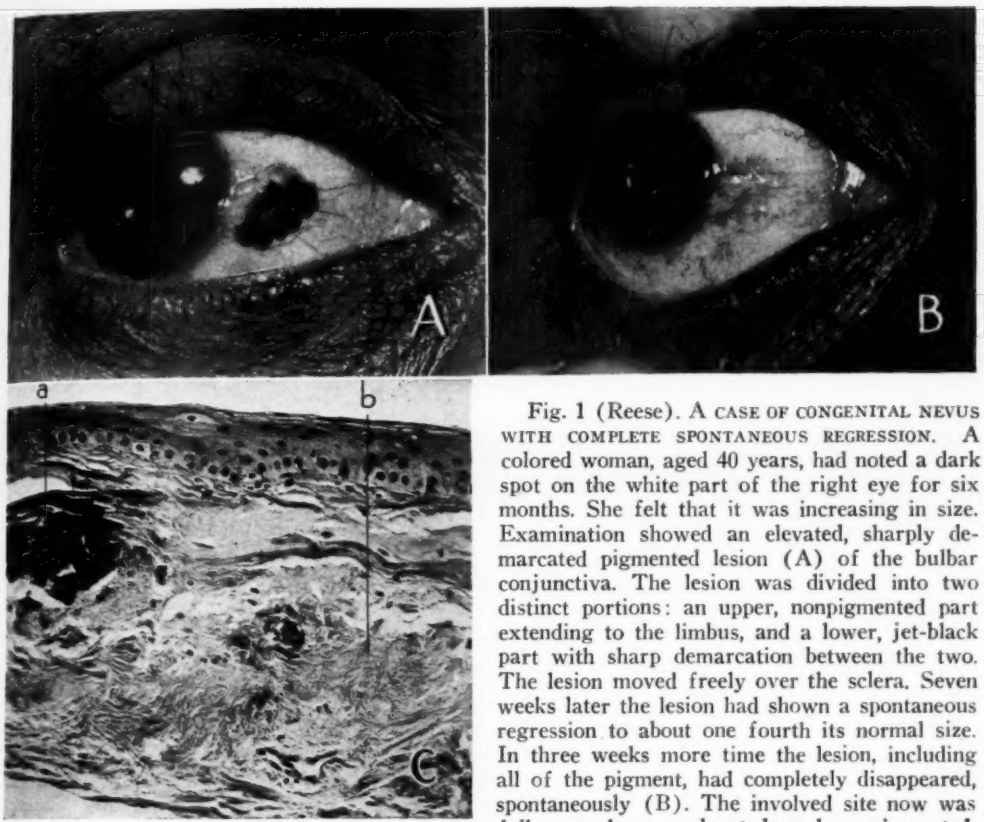


Fig. 1 (Reese). A CASE OF CONGENITAL NEVUS WITH COMPLETE SPONTANEOUS REGRESSION. A colored woman, aged 40 years, had noted a dark spot on the white part of the right eye for six months. She felt that it was increasing in size. Examination showed an elevated, sharply demarcated pigmented lesion (A) of the bulbar conjunctiva. The lesion was divided into two distinct portions: an upper, nonpigmented part extending to the limbus, and a lower, jet-black part with sharp demarcation between the two. The lesion moved freely over the sclera. Seven weeks later the lesion had shown a spontaneous regression to about one fourth its normal size. In three weeks more time the lesion, including all of the pigment, had completely disappeared, spontaneously (B). The involved site now was dull, granular, nonelevated, and nonpigmented. After two months, no change was noted, and a piece of tissue from the former site of the lesion was removed for biopsy (C). Under the conjunctiva is a structureless, amorphous, degenerated tissue with no visible nuclei. At (a) and (b) there is coagulation necrosis with calcium deposition in (a). This tissue showed negative reaction to stains for hyalin. No trace of pigment or nevus cells. (Hematoxylin and eosin stain.) This was a congenital, nonpigmented nevus which suddenly became partially pigmented and later went on to complete and spontaneous regression.

toplasm of a melanoblast. This seems to convert a preëxisting premelanin or melanogenic substance in the protoplasm into black, visible melanin. It probably does not cause the melanin to be produced by metabolism of the cell protoplasm. The oxidation of this preëxisting leukomelanin into black melanin takes place rapidly and is reversible; that is, after the melanin has been formed, it can be reduced to the invisible premelanin. Clinically, we may see the pigment content of a nevus increase rapidly and this change is frequently mistaken for active growth. Also, the pigment content of a nevus may decrease and, in fact, the entire nevus may disappear spontaneously and completely (fig. 1). Also, acquired spontaneous precancerous melanosis may appear, regress, and reappear (fig. 2). This fluctuation in the pigment content is contingent on the process of oxidation and reduction.

There is evidence of a hormonal influence in pigmentation in animals and man. The sex hormones in particular are implicated as shown by many workers including Willier[4] using the color pattern in the plumage of birds and Gordon[5] using fishes, as their media. Hamilton[6]

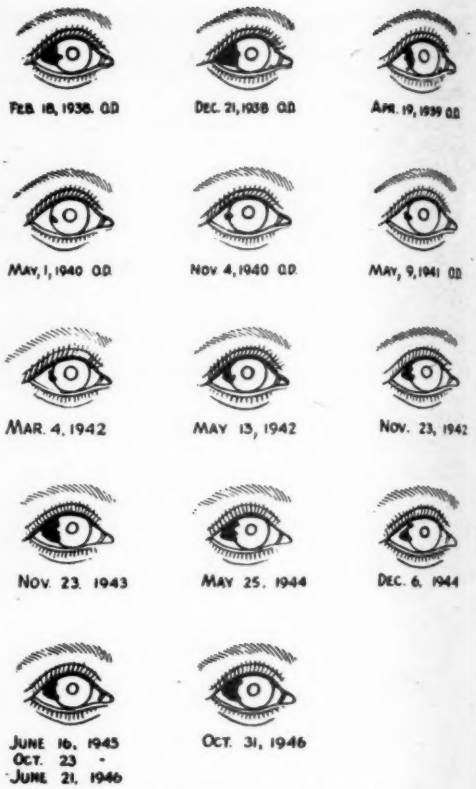


Fig. 2 (Reese). A CASE OF PRECANCEROUS MELANOSIS WITH SPONTANEOUS REGRESSION AND REAPPEARANCE. A woman, aged 45 years, noticed what she thought was a hemorrhage the size of a pinhead on the white part of the right eye in 1931. This gradually enlarged. She was observed first in February, 1938, at which time there was a nonelevated, pigmented lesion of the bulbar conjunctiva temporally adjacent to the limbus, measuring 5 by 5 mm. and encroaching for 1 mm. on the cornea. There was a diffuse, fine, granular pigmentation of the bulbar conjunctiva nasally. The patient was observed elsewhere from time to time until December, 1938, when it was noted that the lesion measured 7 by 7 mm. with no apparent increase in the granular pigmentation nasally. In April, 1939, it was observed that the lesion had regressed. The regression occurred spontaneously as there had been no treatment. The drawing above shows consecutive sketches drawn to scale. Some of these were used in a previous article.[49] The fine, granular pigmentation of the bulbar conjunctiva nasally also disappeared. In May, 1941, no actual recurrence was seen, but there was noted with the slitlamp a fine, granular pigmentation at the site of the former lesion and for some distance around it. In May, 1942, in addition to the pigment shown in the sketch, there was also noted again a slight diffuse pigmentation of the bulbar conjunctiva nasally.

In addition to the ocular findings, there were pigmented lesions elsewhere which were undergoing changes. In April, 1939, a pigmented lesion on the right cheek of unknown duration disappeared spontaneously, leaving a slightly elevated, nonpigmented area, with an uneven surface, measuring 5 by 3 mm. In May, 1941, there was a slightly brownish papule in the right periauricular region, measuring 4 mm. in diameter, of three months duration. In October, 1941, this lesion had disappeared.

and others have studied the pigment deficiencies of eunuchs. Pack[7] has never encountered a malignant melanoma in human beings before puberty but feels that they are particularly prone to occur, and to be unusually malignant at the time of puberty. The pigment in the skin, in congenital nevi, and in the iris also manifests itself more markedly at puberty. A melanoma is more malignant when it occurs during pregnancy at which time there is also other evidence of pigment activity, as exemplified in the usual increase in the pigmentation of the areola of the breasts and vulva.

There is not much evidence that genetics and heredity play a very important role in pigmented tumors. There are a few instances, however, in which a definite familial tendency was observed in the incidence of malignant melanoma of the uvea. The most noteworthy is that cited by Davenport[8] of five cases in three generations of one family. I have seen two sisters with a malignant melanoma of the ciliary body. Gordon[9] has demonstrated the significance of genetics and heredity in the transmissibility of melanoma in fishes.

Free melanin is liberated from the protoplasm of melanoblasts of the skin and conjunctiva both as a constant physiologic occurrence and as a response to some provoking factors, such as actinic rays, neoplasms, and hyperpigmented states. The melanin particles are either absorbed and may be detected in the urine and the lymph nodes, or they may be phagocy-

tosed by the histiocytes of the derma or submucosa. The cells that take on, and merely harbor melanin made by other cells are called melanophores or chromatophores.

Types of melanoblasts

I have given this preliminary discussion of melanoblasts and melanin in general, and my efforts will now be directed toward presenting histologic and clinical evidence in favor of the existence of various types of melanoblasts from which stem various types of tumors. The subject is still highly speculative but there does seem to be sufficient evidence to warrant using the following outline for the purpose of this discussion.

Neurogenic melanoblast

A. Schwann cell
   Location: all peripheral nerves
B. Nevus cell
   Location: peripheral sensory nerve terminals
C. Melanoblasts stemming from secondary optic vesicle
   Outer layer—
   1. Location: pigment epithelium of the retina and ciliary body (fig. 3-A, B)
   2. Location: dilator and sphincter muscles of iris (fig. 3-C)
   Inner layer—
   Location: pigment epithelium of iris (retinal epithelium of iris) (fig. 3-D)
D. Lepto-meninges (pia)
   Location: brain and optic nerve

Ectoderman melanoblast

Location: basal layer of the skin and mucous membranes

Mesodermal melanoblast

Location: uvea, sacral and extrasacral mongol spot

Neurogenic melanoblasts

A. Schwann cell

A fibrous syncytium of Schwann cells sheathes all peripheral nerves immediately upon their exit from the central nervous system. Normally the Schwann cell does not produce pigment, but in pathologic states this cell becomes very versatile and may not only produce melanin but also, according to Masson and Martin,[10] a metaplastic striated muscle; according to Wilson,[11] bone; and according to Groth,[12] cartilage and fat. Moreover, it becomes modified at the sensory nerve terminals to form various manifestations of end-organs, including the Meissner corpuscle, the Pacinian body, and the tactile cell of Merkel and Ranvier.

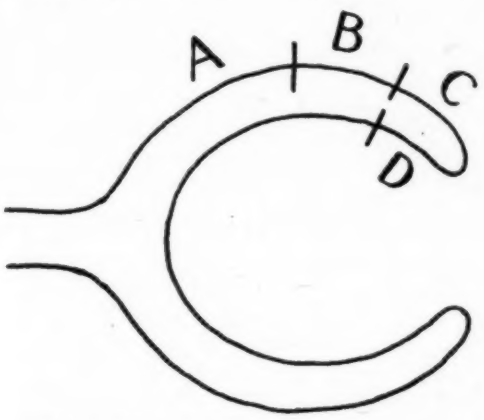


Fig. 3 (Reese). Secondary optic vesicle. A. Anlage of pigment epithelium of retina; B. Anlage of pigment epithelium of ciliary body; C. Anlage of dilator and sphincter muscles of iris; D. Anlage of pigment epithelium of iris (retinal epithelium of iris).

A tumor arising from this cell along the trunk of a nerve usually contains no pigment, is encapsulated, and is benign. In ophthalmology it is more often seen in the orbit and is called a neurinoma or neurilemmoma. A tumor arising from this cell at the sensory nerve terminals or near these nerve terminals is usually associated with the production of pigment, is

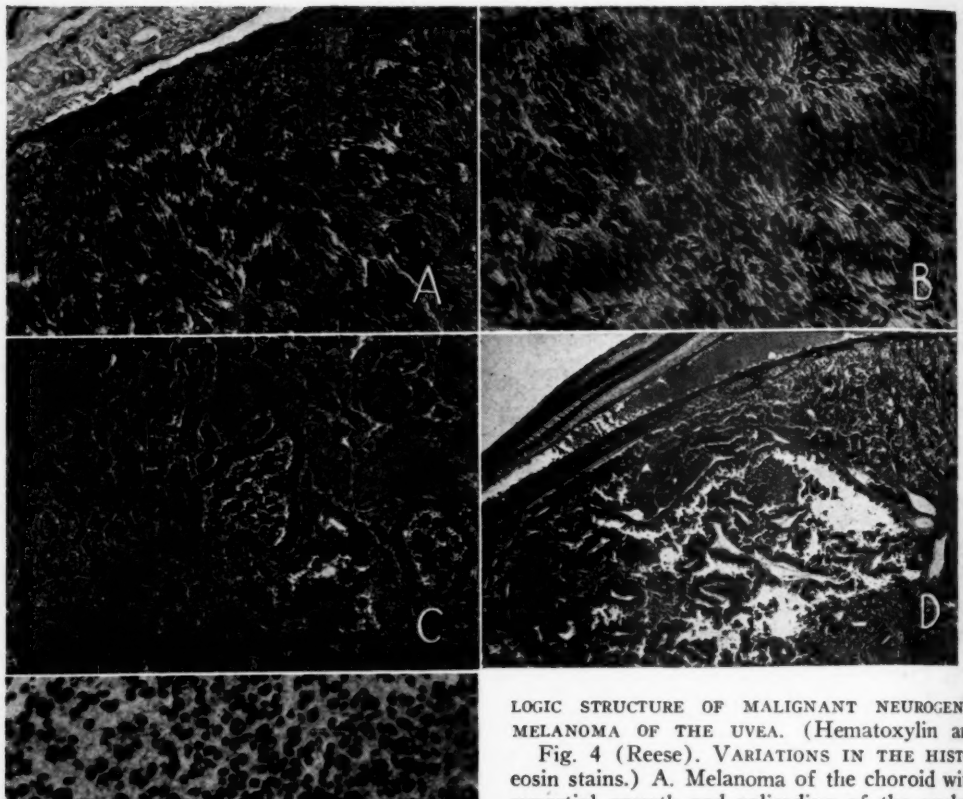


Fig. 4 (Reese). VARIATIONS IN THE HISTOLOGIC STRUCTURE OF MALIGNANT NEUROGENIC MELANOMA OF THE UVEA. (Hematoxylin and eosin stains.) A. Melanoma of the choroid with syncytial growth and palisading of the nuclei; B. Melanoma of the choroid showing palisading of the nuclei; C. Melanoma of the choroid showing fascicular growth; D. Melanoma of the choroid showing alveolar-like arrangement of cells resembling the structure of carcinoma; E. Melanoma of the iris showing nevus cells comprising the greater part of the tumor.

frequently called a nevus or a melanoma, and may be quite malignant. A tumor arising from both the nerve trunk and the sensory terminals, and being, therefore, a diffuse lesion, is usually called neurofibromatosis and this type of lesion is also associated with the production of pigment. According to Stout,[13] 20 percent of neurofibromas become malignant.

A benign or a malignant melanoma of the uvea may also arise from the Schwann cell. This idea was first advanced by Theobald[14] who presented specimens showing nerves fanning out into the tumor tissue indicating that the neoplasm arose from the Schwann sheath. She also pointed out the occurrence of benign pigmented lesions associated with the ciliary nerves.

Further evidence supporting the neuralistic postulate of some melanomas of the uvea is the following:

1. The histologic structure of some of the uveal melanomas is consistent with that of the neurinoma which appears elsewhere. This is particularly true in regard to the syncytial fascicular type of growth and the palisading of the nuclei (fig. 4-A, B, C).

2. The short, as well as the long, ciliary nerves on the side of the globe harboring the melanoma may show enlargement due

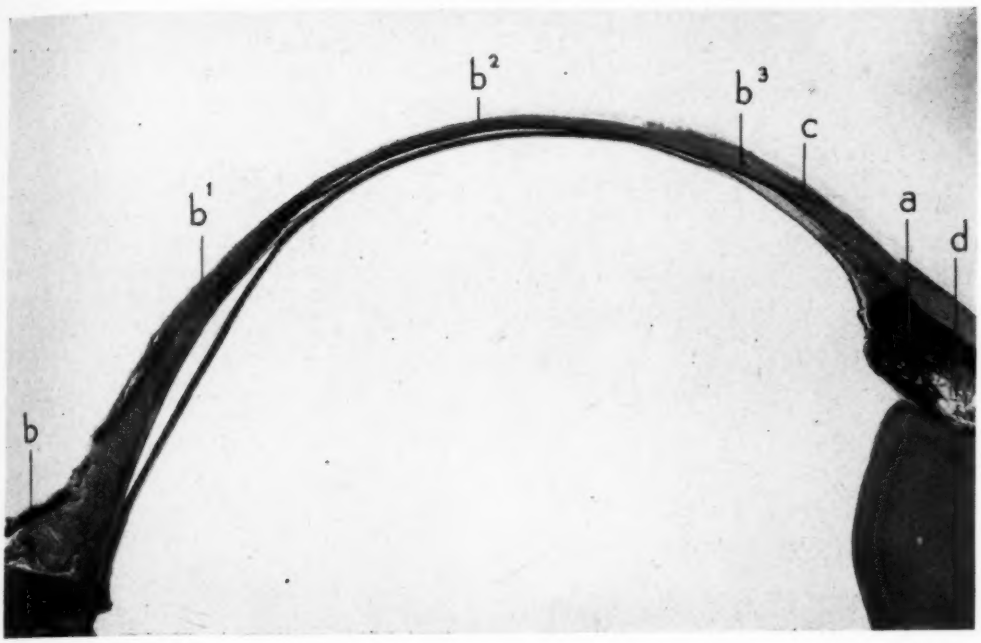


Fig. 5 (Reese). A MALIGNANT NEUROGENIC MELANOMA of the iris (a) with enlargement of the long ciliary nerve seen at (b), (b^1), (b^2), and (b^3). At (c) an intrascleral nerve loop extends off of the main branch. At (d) there are cystic spaces in the tumor. The nerve at (b) and (b^1) is 3 to 4 times the size of the same nerve to the opposite side of the optic nerve. (Hematoxylin and eosin stains.)

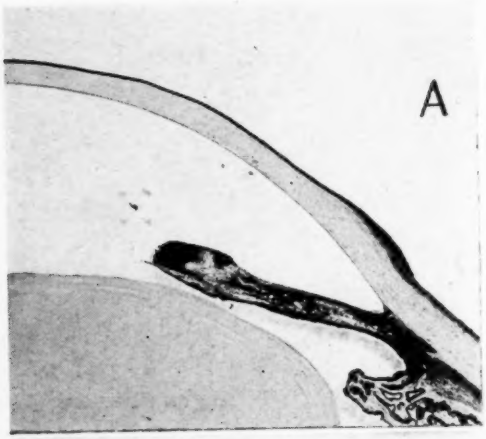
to overgrowth of the Schwannian element (fig. 5). A similar enlargement of the ciliary nerves, but to a greater extent, may be seen in cases of neurofibromatosis involving the trigeminal area but not the orbit directly. In such instances benign pigmented lesions may be present in the uvea.

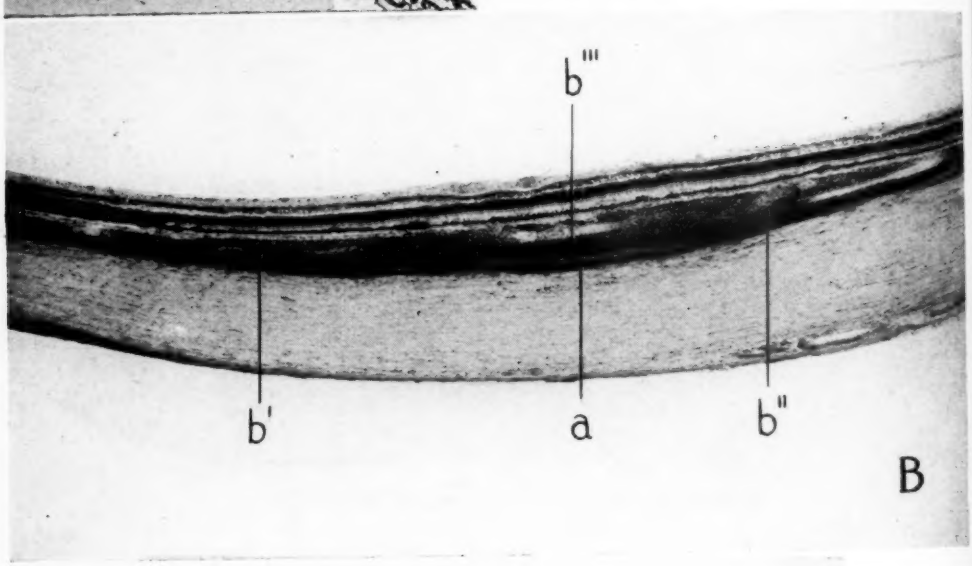
3. A ciliary nerve coursing toward the site of a melanoma of the uvea may show single or multiple benign melanomatous growths composed of Schwann cells (fig. 6-A, B).

4. Typical nevus cells may be seen at sites in a uveal melanoma and in some instances, particularly when the lesion is located in the iris or ciliary body, the entire tumor may be composed of nevus cells (fig. 4-E).

5. There are reports in which the eye affected with a malignant melanoma showed an anesthesia of the cornea (Sédan, 1934[15]) and an alteration in the size and reaction of the pupil (Philippsen, 1891[16]).

6. In amphibia and fowls when a portion of the neural crest is transplanted, the site of the transplantation on the host takes on pigment characteristics of the donor. It has been shown by Willier[17] in fowls that melanoblasts migrate out from the neural crest into the mesoderm and that these cells determine the pigment pattern of the animal. Grafts transplanted before these neurectodermal melanoblasts have migrated into the mesoderm show no pigment changes in the host and those transplanted after the migration show the pigment pattern of the donor animal. This would indicate that neurectodermal melanoblasts can appear far and wide from their anlage, and sug-





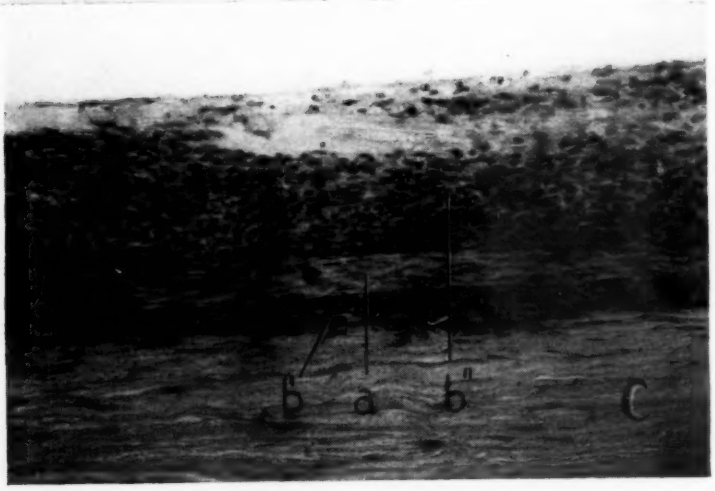


Fig. 6 (Reese). A MALIGNANT NEUROGENIC MELANOMA of the iris with a benign neurogenic melanoma of the long ciliary nerve. A. A diffuse malignant neurogenic melanoma of the iris; B. The long ciliary nerve (a) coursing toward the tumor shows a large fusiform pigmented enlargement (b′), (b″), (b‴), due to overgrowth of the Schwannian cells (benign neurogenic melanoma); C. A high power of (B) at (a) showing long ciliary nerve (a) with its fusiform pigmented overgrowth of Schwannian cells (b′)-(b″).

gests the possibility that melanoblasts most anywhere could stem from the neurectoderm.

7. Cases reported in ophthalmic literature supporting the neurogenic thesis are the following:

a. Strachov[18] reported a case showing general manifestations of Recklinghausen's disease, neurinoma of the right orbit, and a malignant melanoma of the choroid of the left eye.

b. Gartner[19] reported a case of malignant melanoma of the choroid with multiple skin nodules which proved to be manifestations of Recklinghausen's disease. He also cited three other cases in the literature in which the two conditions were associated.

c. Moorhouse[20] reported a tumor of the choroid which resembled a malignant melanoma but was diagnosed microscopically a neurofibroma. He claimed that a subsequent general examination established a diagnosis of Recklinghausen's disease.

Theobald's[14] contention that melanomas of the uvea may be neurogenic is well documented and there seems no reason to doubt that such tumors may arise from Schwann cells. Judging by the behavior of tumors elsewhere which arise from Schwann cells or allied cells, one must presume that the nearer the tumor is to the nerve-trunk type of lesion (neurinoma) the more benign it is, and the nearer it is to the peripheral-nerve type of lesion (melanoma) the more malignant it is.

I[21] called attention to the frequency of benign melanomas of the iris in eyes harboring a malignant uveal melanoma. It seems probable that these multiple manifestations occurred in neurogenic melanomas because diffuseness and multiple sites are common occurrences in neoplastic lesions of the Schwann cell.

B. Nevus cell

To discuss the nature of the nevus is to discuss Masson's contributions[22] on the subject, so completely has his work dominated the picture. However, interpretation of his teachings varies among his disciples. It is conceded generally that the nevus is neurogenic and that it takes origin from the sensory nerve terminals, but, beyond this, speculation is rife regarding the more exact nature of the nevus cell. The Merkel-Ranvier tactile cell is most frequently implicated.

Most of the work on the Merkel-Ranvier cell has been done on lower mammals, and surprisingly little information exists regarding these cells in the human being. Perez,[23] Ebert,[24] and others by special silver stains describe in the human skin a complex terminal arborization of nerve fibers at the dermo-epidermal junction. Expansions of these nerve terminals were noted around the lower pole of cells scattered at irregular intervals in the basal layer or the layer adjacent to it and these cells were larger and clearer than the neighboring cells. This cell type, together with its terminal nerve meniscus, constitutes the tactile cell of Merkel and Ranvier.

Masson[22] describes his "cellule claire" (fig. 7) as occurring at irregular intervals along the junction of the epidermis and the cutis. These cells differ from adjacent cells in their larger, irregular, kidney-shaped nucleus which is denser in chromatin. The long axis of the nucleus is often parallel to the junction of the epidermis and the cutis. Cytoplasmic projections extend into the neighboring intercellular spaces and sometimes into the corium (fig. 7-A, B). A well-defined clear space is noted around the cell. He felt that this clear cell is derived from the Schwann cell which migrated into the epidermis in fetal life.

Masson[22] feels that the tactile cell of

Merkel-Ranvier is indistinguishable histologically from the clear cell, that they are both functional and morphologic modifications of the same cell strain—the Schwann cell—and that the nevus cell stems from these cells.

Nevus cells, besides growing diffusely in the epidermis and corium, frequently grow in small clusters and nests beneath the epithelium, or are arranged as abortive forms of specialized tactile organs such as Meissner corpuscles and Pacinian bodies. Foot[25] believes that the frequent nests of nevus cells can be viewed as caricatures of Meissner corpuscles. In some nevi, and particularly those of the scalp and in neurofibromatosis of the uvea, well-formed and identifiable Meissner corpuscles are seen.

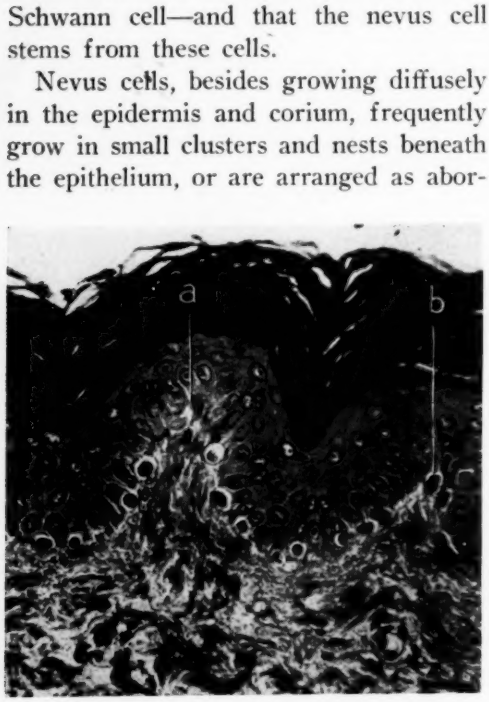


Fig. 7 (Reese). A SECTION OF THE SKIN from the palmar surface of the forearm. The clear cells of Masson are seen scattered along the basal layer. At (a) and (b) a clear cell shows its clear cytoplasmic extension between adjacent basal cells. (Trichrome stain.) (This microphotograph was loaned through the kindness of Dr. Pierre Masson.)

Masson[22] has demonstrated that the structure of a nevus is in general as follows—trunks of sensory nerves approach the deeper layers of the derma beneath the site of a nevus; as those nerves become more superficial they loose their myelin and their Schwann sheath becomes continuous with a syncytium of nevus cells, which bud out along the nerve branches like flowers from a much branched stem; nerve axones can be traced down the center of these branches or "neuroid tubes" and arborize around the nevus cells in the same manner that they do around the tactile cells of Merkel and Ranvier.

The nevus cell is basically a Schwann cell and, therefore, may sheath the terminal branches of the sensory nerves which act as a scaffolding, or appear at the nerve terminal as a modified tactile cell (Merkel-Ranvier, clear cell). Both types may be present in the same tumor, or one or the other may predominate. Thus, we can recognize a superficial and a deep nevus, or a combination of both.

A superficial nevus lies in and just under the epithelium and comes more from the clear cell or Merkel-Ranvier cell. The cells arrange themselves in nests, which, in the deeper portion, are more elongated and columnar around nerve fasicles and, in the superficial portion, are more spheroidal and more closely resemble caricatures of Meissner corpuscles. Pigment formation is more conspicuous.

A deep nevus lies in the derma under the epithelium, arises more from the nerve sheaths and frequently shows an intervening stratum of normal connective tissue between it and the epithelium. The nerve scaffolding with its outgrowths of nevus cells is more pronounced and the tendency to distorted tactile corpuscles is less. The nevus nests have an affinity for the deep hair follicles. A neurofibromatous element is not infrequent and Laidlaw[26] has described what he calls the "cable effect" due to fusiform thickening of associated nerves from proliferation of Schwann cells. Pigment formation is less conspicuous.

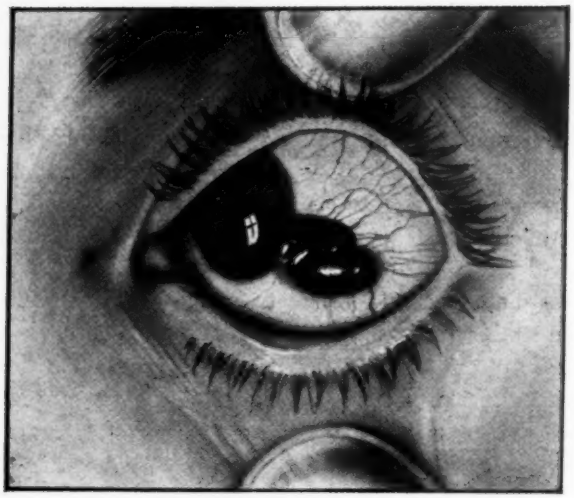
There may be a combination of the superficial and the deep nevus, with the superficial part in relation to the epithelium and separated from the deep portion by an intervening layer of connective tissue. Foot[25] postulates that one might speak of a neurofibroma developing up to the point where the myelin sheath ends in the nerve trunk, and of a neuronevus when the tumor is situated beyond that point, including the end organs of the nerve.

The nevus cell, therefore, is to be viewed as a modified Schwann cell at the site where Schwann cells normally differentiate into various types of sensory end organs. It is a cell which in its metamorphosis lies between the Schwann cell and the fully differentiated end-organ cell. It is thus not surprising to find sometimes in nevi all morphologic stages ranging from the Schwann cell to the fully developed sensory end-organ. The nevus cell in the role of a melanoblast is consistent to the extent that pigment formation is known to be closely associated with the peripheral sensory terminals. Further than this, however, we cannot go except to surmise that perhaps these terminals elaborate an oxidase.

Laidlaw and Murray[26] have advanced a very interesting theory regarding the relationship of nevi to the evolution of the hair follicle. In reptiles and amphibia, which are just below the mammals in the phylogenetic scale, we find normally scattered over the body pigmented dots having the microscopic structures of human nevi. For instance, in the alligator there are numerous black dots prominently seen over the smooth white skin of the upper and lower jaws. Each dot is a tactile organ in which a sensory nerve terminates. As the mammal evolved from the reptilian form, the tactile spots disappeared and were replaced by hair follicles which are primarily tactile organs with color and warmth as secondary functions. In the human being, the association of nevus and hair follicle is not uncommon, and the nerve terminals around the cells composing each are the same, The hairy, pigmented nevus may be viewed as a link or transition between the aforementioned tactile organs of the reptilian type and the hairy tactile organs of the mammalian type. Ribbert[27] felt that many lesions in the human being, including pigmented nevi, represented instances of imperfect survival of structures normal in animals lower in the phylogenetic scale.

In ophthalmology, we see nevi of the skin, of the lids and, more commonly, of the conjunctiva and particularly in the region of the limbus and caruncle. Nevi, or at least their matrices, are congenital, but at birth they are usually not seen because they are small and more or less flesh colored. They seem to grow in size somewhat during the first decade of life, and pigmentation takes place between the ages of 4 to 14 years, particularly around puberty. Some of the larger nevi may show pigmentation even in infancy. It is during the period in which pigmentation is acquired that they are usually noticed for the first time. They seem to undergo some regression in later years and rarely disappear spontaneously and completely (fig. 1). Each individual averages about a dozen or more skin nevi with a predilection for the head, neck, and genital regions.

Approximately one third of the conjunctival nevi do not show pigmentation, but are of a pinkish salmon color. There may be a rather rapid change in the pigment content even in adult life so that a formerly nonpigmented tumor becomes pigmented (fig. 1), or a partially pigmented tumor becomes increasingly pigmented. When the pigment occurs in a formerly nonpigmented growth, the patient may give the history of having noted the lesion for the first time (fig.



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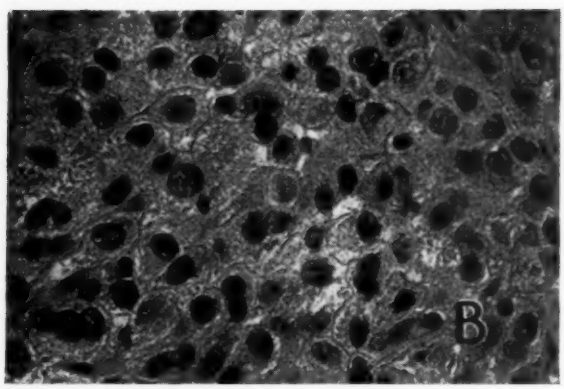


Fig. 8 (Reese). A MALIGNANT NEUROGENIC MELANOMA OF THE CONJUNCTIVA WHICH AROSE FROM A CONGENITAL NEVUS

A man, aged 29 years, had a pigment spot on the bulbar conjunctiva of the left eye temporally ever since he can remember. When inducted into the army five years ago, the lesion was diagnosed as congenital nevus. During the past two years the spot has grown progressively larger and more elevated. Three months ago it was excised.

A. The lesion before excision. The tumor is quite elevated and sharply demarcated with an upper, flatter, and more densely pigmented portion and a lower, more elevated, but less densely pigmented portion. Many large blood vessels course to the lesion.

B. A section from the excised tumor. The cell border of the protoplasm is well demarcated; there is variation in the size of the nuclei with a tendency to multinucleated cells. (Hematoxylin and eosin stains.)

The tumor recurred three months after the excision, and an exenteration of the orbit has been done.

1). When there has been an increase in the pigment content, both the patient and the doctor may mistake this for growth of the tumor. The appearance and disappearance of melanin in these tumors is based on oxidation and reduction as previously discussed.

There is no doubt that a nevus can develop into a malignant tumor, but such an occurrence is an extreme rarity. When

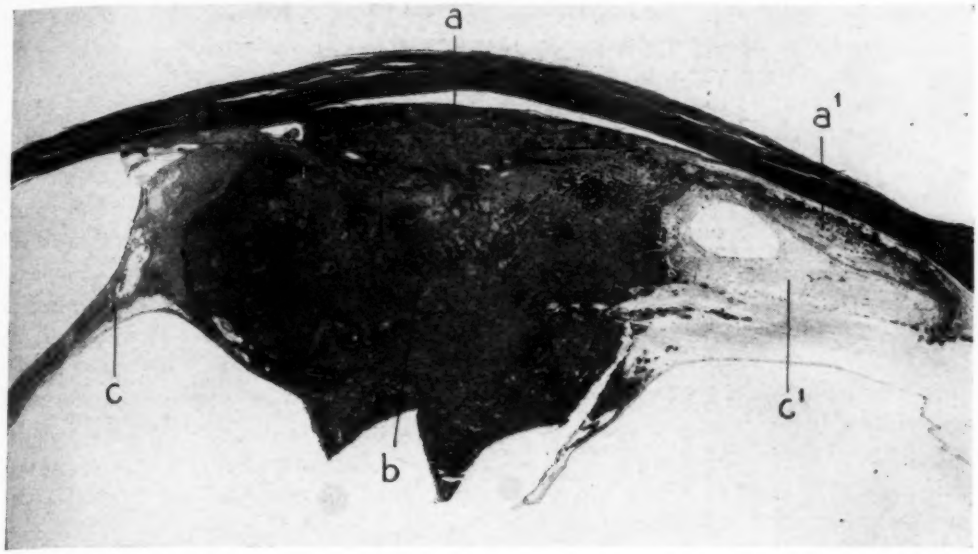


Fig. 9 (Reese). HYPERPLASIA OF THE PIGMENT EPITHELIUM of the retina into a large tumorlike mass resulting from an old inflammatory process of childhood.

A woman, aged 56 years, had attacks of "sore eyes" about the age of 5 to 6 years. After this the vision was always poor. For five years both eyes were painful and the vision became further reduced with ultimate blindness and severe pain in the left eye requiring enucleation.

Clinical examination of the left eye showed dilatation of the episcleral vessels and a tension of 70 mm. Hg (McLean). There was a corneal pannus which prevented a view of the interior. The right eye was slightly congested; the cornea showed opacities; there were posterior synechiae; and the tension was 38 mm. Hg (McLean).

The above microphotograph is from the left eye and shows marked hyperplasia of the pigment epithelium. At (a) and (a^1) the hyperplasia still resembles the mother cells but at (b) it takes the form of a tremendous plaque of metaplastic fibrous tissue interspersed with pigment. The complete gliosed and adherent retina is seen at (c) and (c^1); and elsewhere in the eye there was some bone formation in old scar tissue.

The cornea showed old, degenerating scar tissue with calcium deposits; there were peripheral anterior synechiae, occlusion of the pupil, and complete glaucomatous cupping of the disc. (Hematoxylin and eosin stains.)

The consensus of those who studied this section, including Dr. F. H. Verhoeff, was that this represented a pure hyperplasia of the pigment epithelium into a tumorlike mass. (It is through the courtesy of the American Registry of Ophthalmic Pathology and Dr. J. C. Johnston of Charlotte, North Carolina, that this specimen is available.)

such a malignant melanoma does arise, it is a localized elevated tumor mass (fig. 8-A).

True nevus cells may constitute a part or the whole of a neurogenic melanoma of the uvea and particularly is this true when the site of the tumor is in the iris or ciliary body (fig. 4-E). The reason no doubt is that sensory-nerve terminals are more frequent in the anterior uvea. The occurrence of true nevus cells in the uvea has never been pointed out. This finding furnishes a necessary link in establishing the relationship of some uveal melanomas to the neuronevus seen elsewhere.

C. MELANOBLASTS STEMMING FROM THE SECONDARY OPTIC VESICLE

The entire outer layer of the secondary optic vesicle gives rise to melanoblasts. The posterior portion is the anlage of the pigment epithelium of the retina (fig. 3-A); the middle portion, the pigment epithelium of the ciliary body (fig. 3-B);

and the anterior portion, the dilator and sphincter muscles of the iris (fig. 3-C). Only the anterior portion of the inner layer of the vesicle gives rise to melanoblasts—the pigment epithelium of the iris (fig. 3-D).

Outer Layer

1. PIGMENT EPITHELIUM OF THE RETINA AND CILIARY BODY

a. *Tumors arising from the pigment epithelium of the retina.* These cells proliferate on the slighest provocation. When sufficiently provoked by pathologic processes, their hyperplasia may manifest itself in large plaques of tissue having the characteristics either of the mother epithelial cell or of the metaplastic fibrous tissue (fig. 9). It is safe to say that practically all acquired pigmentary changes in the fundus, not of a neoplastic nature, occur as the result of proliferation of this tissue. It is strange, therefore, that neoplasms arising from these cells are among the rarest occurrences in ophthalmology. Pure hyperplasia into tumorlike masses provoked by some chronic pathologic process in the eye is the usual lesion seen (fig. 9), but as an extreme rarity a true neoplasm may arise from this hyperplasia. These hyperplastic and real tumors are usually found coincidentally in eyes removed for other causes. That the neoplasms arising from this tissue may be malignant and metastasize is illustrated by the case reported by Griffith.[28] This is a 37-year-old man whose left eye had been blind for several years. Recently this eye became painful and was, therefore, enucleated. In the routine examination of the eye, a tumor arising from the pigment epithelium was found. Seven months later a recurrence in the orbit was noted, and three months later the patient died from metastasis to the liver.

b. *Tumors arising from the pigment epithelium of the ciliary body.* In these cases (fig. 10) the overlying nonpigmented epithelium, as well as the pigmented epithelium, may participate. These tumors arise under the same circumstances as those of the pigment epithelium of the retina. They are seen in adult eyes which have been blind for many years, often since childhood. In these eyes there is always residuum of an old inflammatory process, such as a cyclitic membrane with bone formation resulting from an old endophthalmitis. The tumor begins after the inflammatory process has run its course, as evidenced by the fact that the tumor cells invade the already formed organized fibrous tissue or bone. Histologic evidence indicates that the tumor unquestionably arises from a pathologic proliferation of the epithelium.

2. DILATOR AND SPHINCTER MUSCLES OF THE IRIS

Tumors arising from this layer are spontaneous neoplasms. They have the clinical characteristics of involving primarily the pupillary area, showing a flat, diffuse type of growth, and frequently producing an ectropion of the pigment epithelium. These tumors are referred to as leiomyomas.

Inner Layer

PIGMENT EPITHELIUM OF THE IRIS (RETINAL EPITHELIUM OF IRIS)

The tumors from this layer also arise from a hyperplasia provoked by an old inflammation. Spontaneous tumors may also arise from the layer. These occur in younger persons and the tumor tissue resembles more or less the embryonic type of retina. They are usually referred to as dictyomas.

D. MELANOBLASTS OF THE LEPTO-MENINGES

The pia covering the optic nerve normally contains long, branching melano-

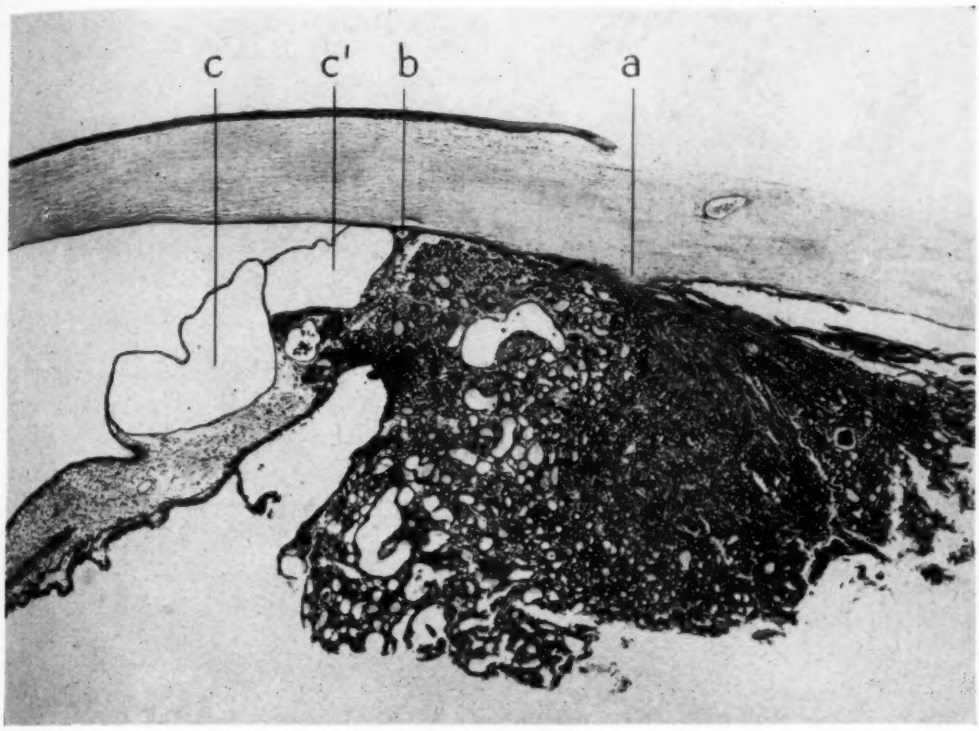


Fig. 10 (Reese). A MELANOADENOCARCINOMA of the ciliary body arising from the pigment epithelium subsequent to an old inflammatory hyperplasia.

A woman, aged 46 years, suffered a penetrating injury to the right eye at the age of 16 years. Following this the vision was decreased and has become gradually worse so that for the past five years the eye has been blind. During the past year the eye has been red off and on and sufficiently painful to warrant enucleation.

Clinical examination showed congestion of the bulbar conjunctival vessels, especially nasally. In the periphery of the iris at the upper nasal quadrant from the 1- to the 4-o'clock positions, there is a cyst, the base of which seems to arise from the ciliary body. The anterior wall is adherent to the cornea in the angle, and the posterior wall rests upon the lens. There is some dense pigmentation of the adjacent iris tissue and dense pigmentation along the anterior capsule of the lens below the cyst. The lens is completely cataractous preventing a view of the interior. Tension is 45 mm. Hg (Schiøtz). The left eye was normal.

The above microphotograph is from the enucleated right eye and shows a melanoadenocarcinoma arising from a hyperplasia of the pigment epithelium of the corona ciliaris. The tumor has invaded and largely replaced the ciliary muscle and processes. The tumor extends into the anterior chamber, from the scleral spur (a) to (b), pushing the root of the iris ahead of it, filling the filtration angle and forming two large thin-walled cysts, (c) and (c^1). The tumor forms acini and multilocular cysts. In the delicate stroma are small areas of calcification. The nonpigmented epithelium participates to some extent in the tumor. (Hematoxylin and eosin stains.)

This represents a malignant tumor arising from a hyperplasia of the pigment epithelium of the ciliary body subsequent to an old inflammatory process. (It is through the courtesy of the American Registry of Ophthalmic Pathology and Dr. Julian N. Dow of Los Angeles, California, that this specimen is available.)

blasts. The frequency and distribution of these pigmented cells of the lepto-meninges have been studied by Baader.[29] Primary malignant melanomas of the leptomeninges arise from these cells. Bailey and Bucy[30] speak of all tumors arising in the meninges as meningioma with some qualifying prefix. Consequently they use

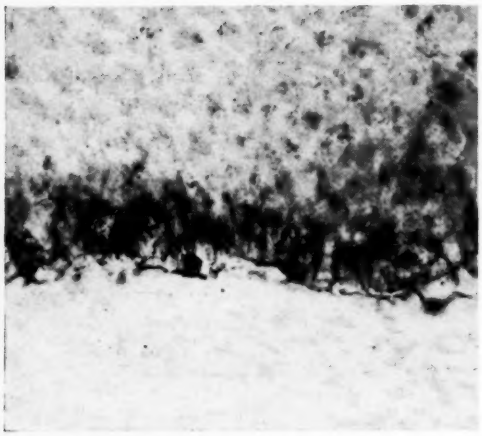


Fig. 11 (Reese). A frozen perpendicular section of the mucous membrane of the anal region showing the dendritic cells of the basal layer. (Ammonium silver stain.) (The microphotograph was loaned through the kindness of Dr. Pierre Masson.)

the term "melanoblastic meningioma" for what others call a malignant melanoma.

Ectodermal melanoblasts

The basal layer of skin and mucous membranes is a site of melanin production. There is not entire agreement as to the nature of the cell or cells in which the melanin is formed. The various cells implicated in this question are the dendritic cell, the Langerhans cell, the clear cell of Masson, the Merkel-Ranvier cell, and the basal cell of the epithelium.

The dendritic cell (fig. 11) is a branching pigmented cell with its nucleus lying in relation to, and at a slightly lower level than, the basal cells and with its cytoplasmic processes ramifying between the overlying epithelial cells and into the underlying corium. When the cell contains no pigment, it is a rather large clear cell with the protoplasmic ramifications indistinctly seen, and this is the cell Masson calls "cellule claire" (fig. 7). Therefore, according to Masson, the dendritic cell and the "cellule claire" are the same cell with different names, depending on the presence or absence of pigment. When pigmented, the cell may be seen in the natural state particularly when there is less or no pigmentation of the surrounding cells. The cell may be brought out by silver staining, as well as by the dopa reaction which is strongly positive. These cells are increased in number after irradiation and in hyperpigmented states.

Masson[31] and others regard these dendritic cells as the sole producers of pigment. They believe that through their cytoplasmic processes these dendritic melanoblasts distribute pigment to cells in contact with them (fig. 12) and that all other cells, being the recipients and harborers of pigment, are melanophores. The protoplasmic processes of the dendrites are said to form not only a syncytium but also to extend to the corium and make contact with reticulo-endothelial system and, therefore, indirectly with the vascular endothelium and circulating blood. They, therefore, constitute a communicating cellular net effecting a metabolic exchange between the circulation and the epidermis. From the corium, the dendrites derive substances of the pigment matrix, form melanin, and deliver it through their processes to the epidermal and dermal cells.

The Masson[31] concept interprets the dendritic melanoblasts as elaborating or excreting melanin in the same way that glandular cells excrete their products and, therefore, should be really considered glandular cells. The protoplasmic processes inoculate or inject the pigment into the cells of the epidermis and derma with which they come in contact (fig. 12).

The dendritic melanoblasts may wear out and cease to function as melanogenic cells. Such cells are probably replaced by a proliferation of the persisting melanoblasts. Masson[31] surmised that Langerhans' cells are worn-out or eliminated dendritic cells.

In support of their concept, the proponents cite the fact that in vitiligo some

dendritic melanoblasts still remain but lose their dopa-reaction and, therefore, their melanogenic function. In such instances the epidermis and the derma remain colorless. Also, regions sparsely pigmented such as the palms and soles show pigmentation only of the basal cells in contact with protoplasmic processes of the dendritic cells while the basal cells elsewhere are unpigmented.

Opposing this theory of Masson's,[22, 31] Bloch[32] has advanced several arguments:

1. There is a scarcity of histologic evidence.

2. Experimental work has failed to produce evidence that the basal cells have phagocytic properties.

3. The fact that the basal cells contain a pigment-forming ferment giving a positive-dopa reaction is not taken into account.

4. No explanation is given of how pigment is formed in skin containing no, or only a few, dendritic cells.

5. If melanoblastic properties belong only to the dendritic cells, it is difficult to understand why so long a time elapsed before these cells were found in normal human epidermis.

6. No explanation is given as to how marked pigmentation can exist in normal epidermis, as in the areola of the nipple, with no dendritic cells demonstrable; or, how pigmentation can occur in pathologic melanotic structures with no dendritic cells discernible even with the special stains.

Another hypothesis, which to me seems tenable, is that the dendritic cell represents only a morphologic variation from the basal cell. The number of the dendritic cells varies a great deal within a wide range, and all transitional forms, from the typical dendritic cell to the typical basal cell, seem discernible.

There are many observers who believe that the dendritic cell is merely a well-defined functioning state of a normal pigment-producing basal cell; that is, a melanoblast par excellence. According to Darier,[33] Bloch,[34] Miescher,[35] Kreibich,[36] and others, the basal cell changes its form and becomes the dendritic cell when its pigment-forming function is at its highest, and, according to Kreibich,[36] it changes back to its usual state of rest when increased activity subsides.

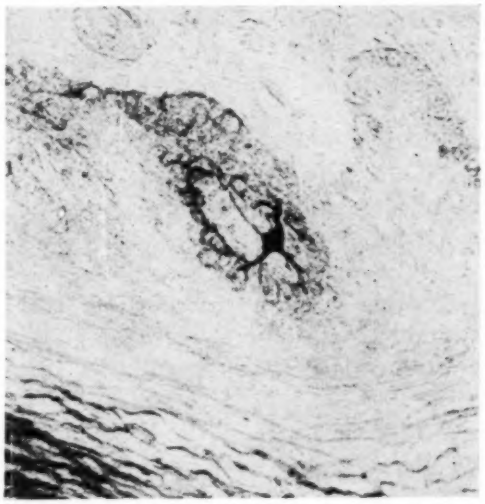


Fig. 12 (Reese). A section from the skin of the large toe showing a single dendritic cell distributing its melanin to the basal cells in contact with the dendrites. Elsewhere the epidermis is free of melanoblasts and pigment. (Cajal stain.) (This microphotograph was loaned through the kindness of Dr. Pierre Masson.)

It is well known that the pigment epithelium of the retina has phototaxic properties exemplified by the protoplasmic extensions which occur between the rods and cones under exposure to light. This has been demonstrated in animals and is supposed to be true in man. I feel, therefore, that this phototaxic property may be an attribute of the basal layer of the epithelium and that the dendritic processes merely represent morphologic alterations in these cells resulting from their phototaxic property. The following is in support of this thesis:

1. It is known that the dendritic cells

increase in number after exposure to irradiation, and Meirowsky[37] found that the areas in which these cells have been increased in number by exposure to irradiation later showed a replacement of the dendritic cells by the normal-appearing basal cells. Peck[38] showed that in human skin after exposure to Thorium-X approximately 40 percent of all the basal cells were dendritic. He concluded, therefore, that dendritic cells are most likely a functional modification of ordinary basal cells.

2. Pigment in the basal cells is frequently located as a pigment cap at the superficial pole of the cell, that is, the pole toward the light.

3. After exposure to sun, pigment migrates through the epithelium even to the point of more or less depleting the basal layer. Even the skin of cadavers darkens on exposure to ultraviolet light due to the migrating of melanin to more superficial layers (Blum[39, 40]).

According to Meirowsky,[37] the dendritically constructed melanoblast is present even in a state of rest, and its true form manifests itself by the influx of pigment into the preformed protoplasmic channels. The flow of pigment in prescribed protoplasmic channels has been demonstrated in amphibians, reptiles, and fishes, but not in higher animals (Schmidt,[41, 42] Biedermann[43]).

The so-called Langerhans' cell is only brought out by gold-chloride staining and is seen as a delicately branching structure in the epidermis, 3 to 5 cell layers from the corium. No nucleus has ever been demonstrated in this structure and, therefore, it is not a cell entity. Contrary to the belief, which has been erroneously propagated in the literature, the structures do not contain pigment and have nothing to do with pigment formation. Langerhans[44] considered them nervous end-organs. Masson,[45] Pautrier-Levy,[46] Caudière,[47] and Redslob[48] have added to the confusion by merging into one the structure of Langerhans and the dendritic cell, and calling it "cellules de Langerhans." As previously mentioned, Masson[31] viewed the structures described by Langerhans as worn-out dendritic cells which have ceased to function as melanogenic cells.

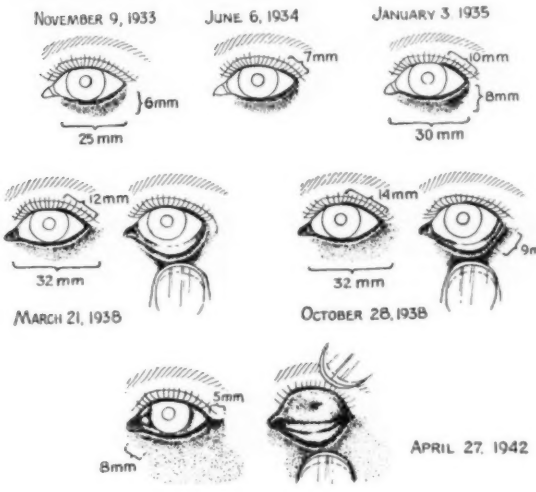
The nature of the Merkel-Ranvier cell has been discussed under "Nevus Cell" but it injects itself into this issue because of its position in relation to the basal layer of the epthelium and because by some it is considered identical to the dendritic cell and the clear cell.

I believe that the basal cells per se of all epithelium are melanoblasts or potential melanoblasts and that from these cells arise pigmented tumors having specific characteristics. The pigmented tumors in which the basal layer of the epithelium participate are:

1. Precancerous melanosis. At the average age of from 40 to 50 years, there may appear in the skin of the lids or the conjunctiva or both a nonelevated, diffuse mottled and more or less granular-appearing pigmentation which may remain with little or no change in a precancerous state for from 5 to 20 years before becoming malignant. The interval may be a great deal longer or considerably shorter, and sometimes the melanosis is malignant from the beginning. The pigment in the lesion may regress and recur (fig.2).

2. Cancerous melanosis (figs. 13 and 14). This is a malignant lesion which develops from precancerous melanosis. It may be so diffuse as to involve almost all the bulbar and palpebral conjunctiva and adjacent skin and still be entirely flat with no localized tumor mass. This is a very malignant tumor, and sometimes its harmless appearance with no elevation belies its serious character.

Both precancerous and cancerous melanosis histologically stem from the basal layer of the epithelium (fig. 14-B). These basal cells increase in number, be-



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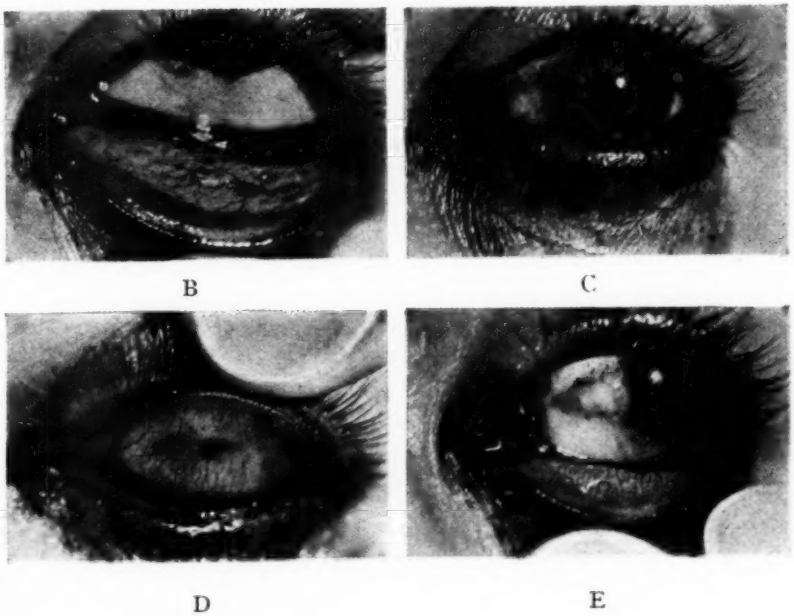


B C D E

Fig. 13 (Reese). A CASE OF CANCEROUS MELANOSIS DEVELOPING FROM PRECANCEROUS MELANOSIS

A man, aged 50 years, first noticed a pigmented spot about the size of a pin point along the margin of the left lid in 1915. By 1927, it was about the size of a pinhead. There was further enlargement, so that, in 1932, a biopsy was performed; this showed precancerous changes. The lesion steadily progressed and the patient refused treatment. The sketches in A, drawn to scale, show the progression from November, 1933, to April, 1942. In May, 1942, Kodachrome slides were made as follows: B, pigmentation of the lower palpebral conjunctiva, fornix, and bulbar conjunctiva, shown with the lower lid pulled down; C, pigmentation of the upper and lower lids and the bulbar conjunctiva; D, pigmentation of the upper and lower lids and the upper palpebral conjunctiva, shown with the upper lid everted; E, pigmentation of the upper and lower lids, bulbar conjunctiva, caruncle, and semilunar fold, shown with the lower lid pulled down. At no site is there any elevation of the tumor, except perhaps in the lower fornix. The tumor is in the malignant phase, and exenteration should have been done at a much earlier period. (This case was used as an illustration in a previous article.[49])

A

Fig. 14 (Reese). A CASE OF CANCEROUS MELANOSIS DEVELOPING FROM PRECANCEROUS MELANOSIS

About 18 years ago, a woman, now aged 45 years, noted a small area of pigmentation on the conjunctiva of the left eye near the inner canthus. Ten years ago the lesion began to increase slowly in size and during the past seven years it has progressed with increasing rapidity.

A. The lesion just before exenteration. There is a diffuse, entirely nonelevated, granular pigmentation of the palpebral and bulbar conjunctiva, caruncle, semilunar fold, and lid margin.

B. A section of the conjunctival tumor. There is an increase in the basal cells which are large, hydropic, and extend into the submucosa and the overlying epithelium. (Hematoxylin and eosin stain.)

come pigmented, swollen, hydropic, and separated from one another by clear spaces. The proliferated basal cells extend into the overlying epithelium and sometimes replace it. They also extend into the underlying stroma.

3. The cells composing a basal-cell epithelioma may show a pigmentation which can be quite marked resulting in a uniformly dark-pigmented lesion sometimes clinically called a malignant melanoma.

4. A papilloma may also be darkly pig-

mented and thereby provoke the diagnosis of melanoma.

The nevus and the malignant melanoma which arises from it have different characteristics from the precancerous melanosis and the subsequent malignant melanosis.

The nevus is congenital, appears as a localized elevated lesion, rarely becomes malignant, but if it does, the resulting lesion is a localized, sometimes slightly pedunculated, single or multiple tumor mass (fig. 8). The tumor in both its benign and malignant phases is completely radio-resistant. Histologically, the malignant tumor is composed of large nucleolated cells with well-demarcated cell borders. The anaplasia may make the cells composing a melanoma arising from a nevus and one arising from a melanosis difficult to differentiate.

The precancerous melanosis is acquired about middle age or later, affects the conjunctiva and/or the adjacent skin in a very diffuse manner with no elevation, gives rise almost inevitably to the most frequent and malignant type of conjunctival and skin melanoma called malignant melanosis characterized by its diffuseness and lack of elevation (figs. 13 and 14-A). In the precancerous stage the melanosis is radio-sensitive, but in the malignant phase it is radio-resistant. Histologically, the tumor arises from the basal layer of the epithelium (fig. 14-B) and has distinguishing histologic characteristics in the benign and in the malignant phase.

Malignant melanosis of the conjunctiva and adjacent skin is by far more frequent than malignant melanoma arising from a nevus. I have seen only one case of a malignant melanoma of the conjunctiva or adjacent skin which could be said with certainty to have arisen from a congenital nevus (fig. 8-B). In five additional cases, however, the melanoma was suspected of having arisen from a nevus, not because of any known preëxisting nevus, but because of clinical and histologic evidence. I have seen 35 cases of malignant melanosis of the conjunctiva and/or skin of the lids arising spontaneously or from precancerous melanosis.

A review[49] of the voluminous literature on the subject up until 1942 revealed 42 cases that could be identified as definitely or presumably cases of malignant melanosis. Only two cases could be found which could be identified definitely as cases of melanoma which arose from a preëxisting nevus. One was reported by Lane[50] and the other by Rosenstein.[51] In the latter case active growth followed a Koch-Weeks bacillus conjunctivitis. Many reports in the literature had to be discarded as unclassifiable because of incomplete data. On the basis of the cases seen by me and the identifiable cases in the literature, the malignant melanosis of the conjunctiva and skin of the lids is 10 to 15 times more frequent than malignant melanoma of nevus origin.

Mesodermal melanoblasts

These cells are usually long, narrow, and branching, but when their pigment content is increased, they take on a more polygonal or plump shape with few or no processes. Between these two extremes there are transitional stages depending somewhat on the pigment content. These cells are found primarily throughout the uveal tract (fig. 15-inset) and represent the bulk of this tract. They are generally referred to as chromatophores. This term implies that the cell is pigment-harboring rather than pigment-producing. The dopa reaction is negative in the adult but positive for a short period in the embryo. This fact, together with the cell's histologic characteristics in the normal as well as the pathologic state, places it definitely as a true melanoblast. Hereafter this cell will be referred to as the chromatoblast which is more accurate than the term chromatophore.

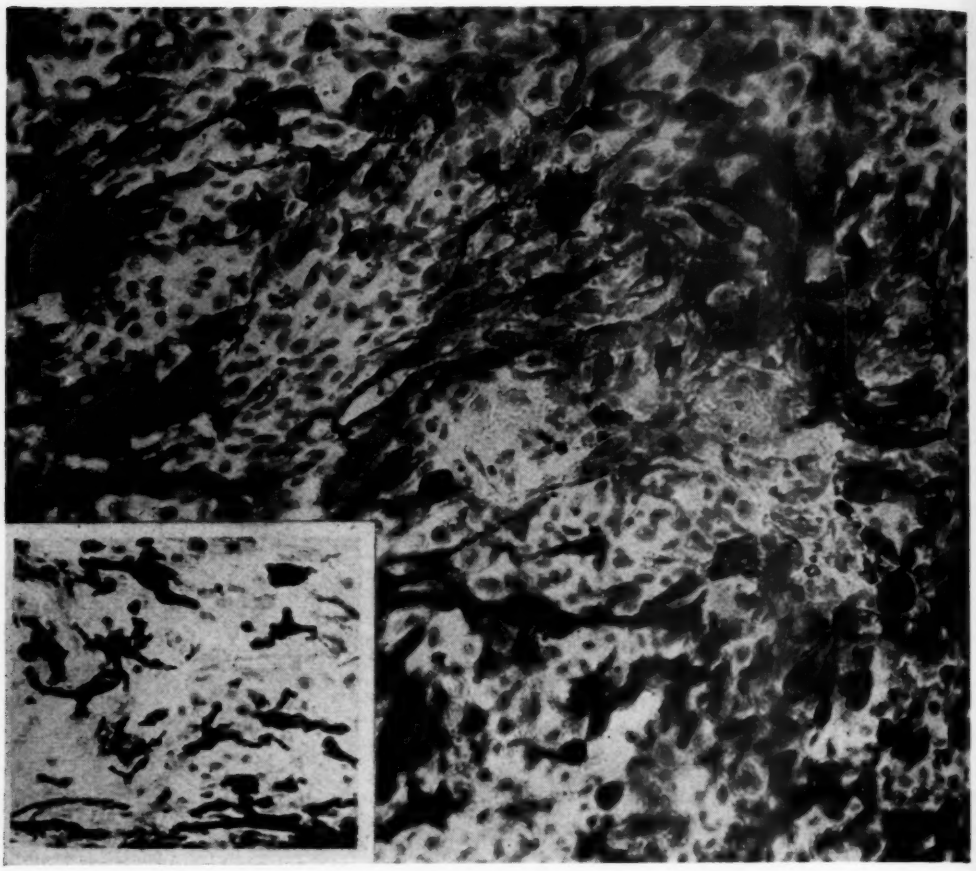


Fig. 15 (Reese). A MALIGNANT MESODERMAL CHROMATOGENIC MELANOMA OF THE CHOROID. The inset shows the normal chromatoblasts of the choroid. The close resemblance of the tumor cells to the normal uveal chromatoblast can be seen. (Hematoxylin and eosin stain.)

It is generally agreed that the uveal tract is mesodermal in origin. The only other site besides the uveal tract where these mesodermal chromatoblasts occur is subcutaneously as atavistic remains of a pigment system. In higher animals, including the monkey, there is normally and constantly present a subcutaneous pigment system composed of long, branching, mesodermal melanoblasts.

This pigment system of higher animals disappeared in the evolution of man except at one site in the region of the sacrum. This formerly was called the Mongol spot because it was thought to be found only in the Mongolian and Negro races. However, it is known now that this pigment system is found regularly over the sacrum, at least microscopically, in all races in the first year of childhood and disappears after about the fourth year. The spot is first seen in the fourth to fifth embryonal month, even before the pigment in the skin appears. The number of cells and their pigmentation increases at birth and for sometime thereafter. The cells are gradually lost and are seen only exceptionally in adult life. In the Japanese, Jijima[52] found in all of 25 cadavers evidence of the spot after adult life. The characteristics and behavior of the spot are the same in both the Mongolian and

Caucasian races except in regard to degree. Furthermore, these pigmented cells at their particular site constitute a normal finding during a certain period of life in both the Mongolian and Caucasian races and, therefore, we are dealing solely with the amount or degree of a physiologic occurrence. Clinically, the sacral spot is a localized, bluish pigmentation in an otherwise normal-appearing skin. Microscopically, it is composed of long, branching, pigment cells normally arranged and spaced deep in the cutis with a pigment-free stratum of connective tissue between it and the epithelium. This gives a bluish color to the skin.

Sometimes such blue areas under normal-appearing skin, identical in appearance to the sacral Mongol spot, are seen elsewhere over the body singly or multiply and with or without the spot at the sacrum. Such lesions are called extrasacral Mongol spots.

The sacral spot is viewed as a physiologic variation comparable to the variation in the amount of pigment seen in the iris stroma. The extrasacral spot is viewed as a rest or rudiment of the pigment system normally present in higher mammals but which in human beings has disappeared except in the sacral region.

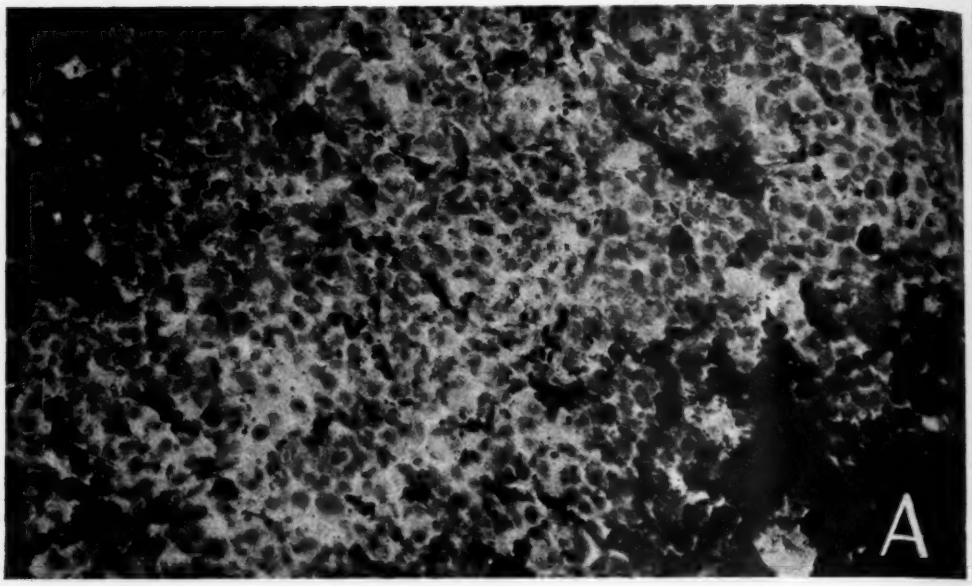
The blue nevus (Tieche-Jadassohn) consists of a localized compact tumorous mass of mesenchymal melanoblasts simulating in location and appearance the melanoblasts seen in the sacral and extrasacral Mongol spot. The differentiation between an extrasacral spot and a blue nevus may not always be sharp. If the melanoblasts do not form a definite, localized tumor mass but merely an irregular structural arrangement, then there may be some doubt as to the proper designation of the lesion. Practically, however, the difference is merely that in the one we are dealing with a congenital rest of a system only rudimentary in man; whereas, in the other we are dealing with a benign growth originating from this rest.

The extrasacral spot and the blue nevus are seen principally on the face and extremities and may appear on the lids and bulbar conjunctiva. In an analysis of the microscopic sections of 50 cases of nevus of the conjunctiva, I found that 4 percent were composed of long, branching, pigmented cells which were interpreted as mesodermal chromatoblasts similar to the type found in the uveal tract. From this analysis it seems that the extrasacral Mongol spot and the blue nevus can appear under the conjunctiva as well as under the skin.

Montgomery and Kahler[53] have reported on 65 cases of blue nevus occurring in 62 patients. Thirty-eight of the lesions were studied histopathologically. They feel that blue nevi are relatively common and, if looked for, they will be found much more frequently than the literature would indicate. The onset in infancy or in early childhood of a firm, blue to blue-gray papule or nodule remaining as such, without increase in size, usually permits a clinical diagnosis of blue nevus. A malignant change is rare, and, when it occurs, it is a relatively slow-growing melanosarcoma.

Laidlaw[2] and others have shown that the pigmented cells composing the sacral and extrasacral spots, as well as the blue nevus, are true melanoblasts. They, therefore, represent the only instances of mesodermal melanoblasts outside the uveal tract. Tumors arising from these cells are the only melanotic tumors to which the name "melanosarcoma" can be correctly applied.

Smith[54] from his tissue-culture studies, found two types of pigment-producing cells in the human being. The one grew like connective tissue and the other like epithelium. The connective-tissue type



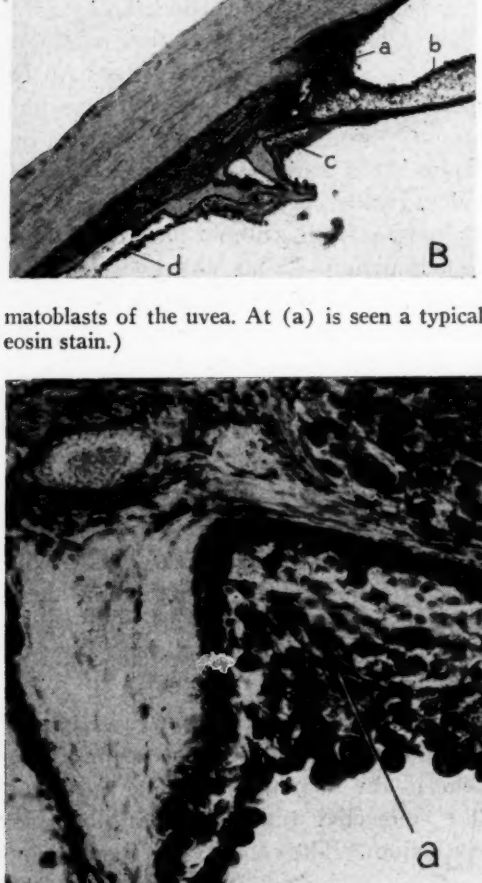
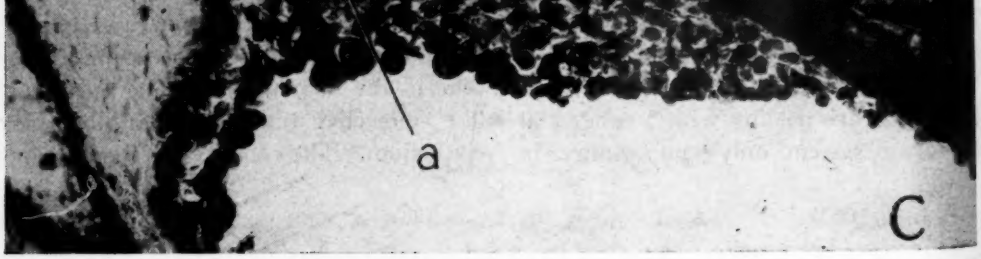


Fig. 16 (Reese). AN ANAPLASTIC MALIGNANT MESODERMAL chromatogenic melanoma of the ciliary body. A. Anaplastic cells with the tendency for the densely pigmented cells to lose their processes and become more or less globular. B. Implantation growths to the side of the eye opposite to the mother site of the tumor. Implanted tumor tissue seen in filtration angle (a), along anterior surface of iris (b), in posterior chamber (c), and along the surface of the ciliary body (d). C. A high-power magnification of the implantation growth in the posterior chamber (B-c). These implanted tumor cells show the morphologic characteristics of chromatoblasts of the uvea. At (a) is seen a typical branching uveal chromatoblast. (Hematoxylin and eosin stain.)



was found in the choroid, ciliary body, iris, and Mongol spot. The epithelial type was found in the skin, hair follicles, retina, and brain. Of 250 benign pigmented tumors of the skin, he found 96 percent to be epithelial and 4 percent connective tissue. Of 100 malignant pigmented tumors of the skin, he found 67 percent epithelial and 33 percent connective tissue. As pointed out by Stout[55] his criterion for the malignant group could be criticized on the ground that epithelium can form spindle cells. It is interesting to note that Smith[54] gives an incidence of 4 percent for the mesodermal melanoblasts which is the same percentage I found from the histologic study of conjunctival nevi.

It is generally accepted that the uvea is mesodermal. The uvea is composed, therefore, almost entirely of melanoblasts which are mesodermal. It is highly improbable that all the melanomas of the uvea are neurogenic or ectodermal, and that no tumor stems from the bulk of the uvea which is the mesodermal chromatoblast. Also, the extremely wide variation in the structure of uveal melanomas indicated by Callender's classification[56] of spindle cell A and B, fascicular, necrotic, mixed, and epithelioid suggests that in this group may be included more than one type of melanoma. A similar suggestion is the wide range in mortality, from 6 to 10 percent to 70 to 80 percent, quoted by Callender, Wilder, and Ash[56] according to argyrophil-fiber content and cytology.

As the result of a study of 410 melanomas of the uvea available in our collection, I feel that, in addition to the neurogenic melanoma already discussed, there is also a chromatogenic melanoma. The cell type of the latter is the mesodermal chromatoblast which gives rise to tumors in the form of benign or malignant chromatogenic melanomas. The cell composing the tumors has, for the most part, the characteristics of the chromatoblast normally identified with the uvea (fig. 15-insert). It is a branching cell which seems to have a tendency to become more globular and lose its processes with an increase in the pigment content (fig. 16-A). In the malignant tumor, there will be found all phases from the typical cell just mentioned to the anaplastic types (fig. 16). These latter cells show a rather large nucleus with a large nucleolus, great variations in the size of the nucleus with a tendency to giant-cell formation, no limiting membrane at the border of the protoplasm, and a tendency for the cells

TABLE 1

CONTRASTS IN THE TWO TYPES OF MELANOMA

	Neurogenic Melanoma	Chromatogenic Melanoma
1. Incidence	++	+
2. Meridian	More often horizontal	No predilection
3. Shape of growth	Flatter	More globular
4. Character of growth	Palisading of nuclei Fascicular and syncytial growth Glandlike arrangement of cells Large cystic spaces Horizontal line in nucleus Nevus cells	Transitional cells from characteristic branching cell to anaplastic cell
5. Pigmentation	+	++
6. Necrosis	+	++
7. Stroma	Large vascular channels	Fine connective tissue septa
8. Disseminated growth	No	Yes
9. Multiple sites	Yes	No
10. Mortality	+	+++

to grow in rows between fine connective tissue septa. The less anaplastic cells may tend to abut on the stroma suggesting the formation assumed by steel fragments towards a magnetic surface.

Table 1 contrasts the two types of uveal melanoma.

Comments on Table 1

1. An analysis of our cases showed that the neurogenic melanoma was twice as frequent as the chromatogenic melanoma.

2. When the neurogenic melanoma involved the choroid, it was twice as frequent in the horizontal meridian as elsewhere. This is thought to be due to the fact that the long ciliary nerves, which seem to be particularly susceptible to benign and malignant pigmented tumors, course in this meridian.

3. There was no great difference in the shape, but generally the neurogenic melanoma was flatter.

4. Rarely the neurogenic melanoma showed a glandlike arrangement of the cells resembling a carcinomatous growth (fig. 4-D). Rarely cystic spaces were present (fig. 5-D). The nuclei sometimes showed a central longitudinal line down the center which was thought to be due to a pyramidal shape of the nucleus.

5. Pigment formation was frequently associated with necrosis.

6. The greater incidence of necrosis in the chromatogenic melanoma is probably a factor in the greater incidence of pigment.

7. The large vascular channels with their accompanying connective tissue constitute the stroma in the neurogenic melanoma.

8. The neurogenic melanoma does not show disseminated growth occasioned by desquamated tumor cells. Such implantation growths away from the primary tumor site are common in the chromatogenic melanoma, especially when the tumor involves the ciliary body and iris (fig. 16-B, C).

9. The neurogenic melanoma is frequently associated with lesions of the ciliary nerves, such as enlargement of the nerves on the side of the tumor (fig. 5), benign pigmented lesions of the nerve coursing to the site of the tumor (fig. 6), and benign pigmented lesions in the eye away from the site of the malignant lesion.

10. The prognosis of the neurogenic melanoma is much better than that of the chromatogenic melanoma. This is particularly true when the neurogenic melanoma is closer to the peripheral-nerve type (neurinoma or neurilemmoma) than it is to the nerve-terminal type.

Callender has reported on the prognosis of uveal melanoma according to cell type which he divides into spindle A and B, fascicular, necrotic, mixed, and epithelioid. It seems fair to assume that: (1) his spindle cell A and B and fascicular represent mostly neurogenic melanomas which had a mortality of 20+ percent; (2) his necrotic, mixed, and epithelioid were mostly chromatogenic melanomas which had a mortality of 60+ percent.

No effort to date has been made to determine the relative argyrophil-fiber or reticulum content of the two types of melanomas.

Conclusion

I have discussed in this presentation tumors which seem to differ genetically, histologically, and clinically but all of which have one factor in common; that is, pigment. However, this one factor is so conspicuous that it tends to dominate the histologic, as well as the clinical picture. I believe that, were it not for this prominent pigment factor, these tumors would be recognized as differing in fundamental respects, including prognosis. Is it not time, therefore, that we cease calling all tumors which harbor pig-

ment "melanomas" and attempt to designate them by various terms which connote their separate entities? The following is suggested terminology:

1. Tumor arising from the Schwann cell and the nevus cell	Benign and malignant neurogenic melanoma.
2. Tumor arising from the pigment epithelium of the retina and ciliary body	Benign and malignant neurogenic melanoepithelioma.
3. Tumor arising from the dilator and sphincter muscles of the iris	Leiomyoma.
4. Tumor arising from the pigment epithelium of the iris	Dictyoma.
5. Tumor arising from the basal layer of epithelium	Precancerous and cancerous melanosis.
6. Tumor arising from the mesodermal chromatoblast (uvea, sacral and extrasacral mongol spots)	Benign and malignant chromatogenic melanoma.

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THE TREATMENT OF RETINITIS PIGMENTOSA WITH SPECIAL REFERENCE TO THE FILATOV METHOD*

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The articles of Filatov and Verbitska[1-6] and their co-workers, which have appeared in the Russian literature, and which have been partially reprinted in this country in the *American Review of Soviet Medicine*, have again served to focus attention upon the treatment of retinitis pigmentosa.

There has been so much publicity in the lay press, and there have been so many inquiries from physicians and others, that a review of this material, and of other forms of therapy, seems to be in order.

Duke-Elder[7] prefaces his chapter on the treatment of this condition with the statement, "that the treatment of retinitis pigmentosa is most unsatisfactory, and, indeed, may be said not to exist."

SURVEY OF THERAPEUTIC METHODS

USE OF MEDICAL DILATORS

The association of choroidal sclerosis and attenuation of the retinal arteries has served to focus most of the therapeutic attempts in the direction of obtaining vasodilatation in the retina. These have consisted of subconjunctival injections[8] of salt solutions and other substances, inhalations of amylnitrite and nitroglycerin, paracentesis, the use of miotics, decompression operations, administration of nicotinic acid, retrobulbar atropine injections, and the use of acetylcholine.

USE OF SURGICAL PROCEDURES

It was only natural that the "transient successes" of the medical dilators should be followed by an attempt to obtain more permanent "improvement" by a surgical approach. For a long time, the section of the sympathetics to the eye, by various surgical procedures, was thought to be the answer; and this too has been discarded. Levine[9] quotes Zehnder as saying, in 1879, that he had noted temporary improvement in cases of retinitis pigmentosa after treatment; but that in no case was this improvement long maintained, and "in no case and through no remedy has there resulted an even transitory improvement in eccentric vision, or enlargement of the contracted visual field."

Dor,[9] in 1873, and Gunn,[9] in 1881, both

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thought that they saw an improvement in fields and central visual acuity after the use of the constant current. Strawbridge[9] felt that the current was of no help. Hall,[9] in 1884, utilized subcutaneous injections of strychnine and administered pilocarpine orally in the treatment of retinitis pigmentosa, and thought that he noted improvement. Redslob,[9] in 1906, thought that he noted improvements after the subconjunctival use of saline.

Mayou[10] after the trephination of one case of retinitis pigmentosa, which did not have an increased tension, reported, in 1914, "gratifying improvement in the vision and fields." He said that "it is a well-known fact in retinitis pigmentosa that anything which improves the circulation will temporarily improve the vision; for example, amylnitrite, subcutaneous injections, paracentesis of the anterior chamber. Trephining flushes the vessels with blood. However, these eyes that are operated on, either for the removal of cataract or for trephining, have a great tendency to form fibrous tissue." A year later, Mayou had to report that the improvement in the case just mentioned was transitory, and that in spite of trephination, the disease had progressed.

Use of glandular extracts

In 1918, Jones[9] thought that he noted improvement after the administration of thyroid-gland extract. Rabinowitz,[7] in 1931, reported on a series of eight patients, treated with inhalations of amylnitrite, as suggested by Imre. His period of observation was but 2½ months. Each patient received from 1 to 10 inhalations daily. He reported improved vision (from 0.4 to 0.85) in six patients; enlarged fields in four, with improvements of from 15 to 20 degrees; and improved dark adaptations in four. There were no demonstrable fundus changes.

Wibaut,[11] in 1931, introduced the use of the female hormone. He reported enlargement of the fields and increased light sense. Of five patients treated, one was greatly improved, two moderately improved, one slightly improved, and one unaffected. Wibaut based his use of this form of therapy on the assumption that retinitis pigmentosa was more common in men and milder in women; hence, he felt that the female genital glands exerted a particular resisting power against retinitis pigmentosa. The preparation which he used was Menformon.

Biro[12] stated that he had noted in some patients of both sexes that at puberty a transitory improvement had taken place in their retinitis pigmentosa. He assumed that this resulted from an increased metabolism and a strengthening oxidative energy, due to the fact that the sexual glands have just started to increase in function. Between the years 1932 to 1938, he treated 35 cases with amylnitrite, sex hormones, and liver extracts. He treated 5 men with testicular extracts; 3 women with glandubolin (a follicular extract); 1 woman with liver injections; 13 patients with amylnitrite inhalations (7 men and 6 women); and 5 men with a combination of amylnitrite inhalations and liver injections. He felt that those with dominant heredity are more responsive to treatment.

Of the five men treated with the testicular extracts, four were said to have been improved. Of these four, the vision of one improved from 5/50 to 5/10. This man was said to have retinitis pigmentosa sine pigmento. Another patient improved "subjectively." Two others had increases in fields, with return of temporal seeing sectors. In one of these, the field return was quite marked.

Of the three women treated with glandubolin, only one was improved; although another claimed "subjective" improvement. The vision of the one woman

was said to have improved from 5/70 to 5/30. The patient treated with liver extract showed an increase in visual field.

Of the 13 patients treated with amylnitrite, 5 were improved. One had a return of vision in the area of the ring scotoma; two had a return of temporal seeing sectors; and one had an improvement of vision from 5/30 and 5/70 to 5/15; another from 5/12 to 5/8; and a third, dramatically, from finger counting to 5/70.

Of the five men receiving both amylnitrite inhalations and liver-extract injections, two were said to have improved; vision in one improved from 5/30 to 5/20; in the other from 5/60 to 5/30. These two men had a return of temporal seeing sectors.

Biro felt that field tests are more important than visual tests in evaluating results. Since he did not make any note about changes in dark adaptation, the assumption is that this test was not done. He concluded his treatise with the statement: "But any one of the methods, either the dilating of the arteries or the raising and stimulating of the retina, is capable of improving in some instances, and, even then, to a slight extent. Not so much that it were apt to arouse hope, but at least in such a measure that it would be a mistake to pass over it indefinitely." It is unfortunate that Biro did not give specific data as to the length of follow-ups on his patients.

Use of amylnitrite and atropine sulphate

Kriloff, Levine, and Tropishko,[13] in 1934, reported on the treatment of optic atrophy and retinitis pigmentosa by the use of amylnitrite, and, later, retrobulbar injections of 1:1,000 atropine sulphate. They noted that the inhalations brought temporary improvement in three of their nine cases of retinitis pigmentosa. When these same patients were later treated with the atropine injections, they were said to have shown more marked improvements. No conclusions as to the efficacy of the treatment were drawn, although these authors felt that atropine was the better of the two drugs in their hands.

Abadie,[7] in 1923, introduced the use of retrobulbar atropine injections for the treatment of optic atrophy. Folk[14] used retrobulbar injections of atropine on a large series of patients with optic atrophy and on two patients with retinitis pigmentosa. While he claimed improvements in his optic-atrophy cases, he felt that, in retinitis pigmentosa, atropine has only a temporary effect and has to be repeated. One of his patients with vision of 20/200 and 10/200 showed no improvement. The other, with an initial vision of 3/200 and 8/200, improved to 12/200 and 20/200, only to fall back to his original level within six months.

Brown[15] utilized the same approach in treating six cases of retinitis pigmentosa, half of which were considered to have been improved. Brown's series had an average two-year check. In one case with minimal involvement, the small scotoma in the fields disappeared early in the course of treatment, and had not returned when reexamined two years later. Vision in another case improved from 20/100 and 20/50 to 20/40 each eye. When reëxamined two years later, vision was 20/20 and 20/30+2, with larger fields than at the time of the initial examination. A third case, with vision of light perception in each eye, was improved to 20/200. This vision was maintained two years later, but the fields had decreased. A fourth case, with vision of 20/50 and 20/100, improved to 20/40 and 20/100; but after two years had gone to 20/100, O.U. A fifth case with light perception in each eye did not improve. His last case had vision of 20/50 in each eye, with a

heavy ring scotoma. Vision in this case improved to 20/30 and 20/50+1. After four months, vision in the right eye dropped back to 20/50, but after more treatment, improved to 20/30. Two years later, this patient's vision was 20/30−3 and 20/40.

Use of hormones and vitamin D

Giambattista[16] utilized the melanophoric hormone of the pituitary gland, both by topical application and by injection, and claimed improvement in dark adaptation. Arthur A. Knapp[17] noted a retinitis-pigmentosalike change in animals after feeding them a low vitamin-D, low calcium diet. He treated nine patients with retinitis pigmentosa by administering high doses of viosterol and calcium-phosphate tablets; and reported, "definite subjective improvement in all." In five cases, the discs became pinker, and the caliber of the arterioles "seemed to be widened." He had similar results with this treatment in myopia.

Vitamin-A therapy

The well-known association of vitamin A and symptomatic night blindness; plus the known fact that the retina is the richest of all the body tissues in vitamin A; plus the additional fact that the rods, which are the hardest hit of all structures in retinitis pigmentosa, are the richest repositories of vitamin A in the retina, has inevitably led to the use of this vitamin in the therapy of symptomatic night blindness and of retinitis pigmentosa. The success of vitamin A in treating night blindness, not associated with visible disease of the retina, is not the concern of this article.

Levine[9] stated: "It has yet to be shown that the retina in a case of retinitis pigmentosa is deficient in vitamin A." He used cod-liver oil, by mouth, in large doses, in the treatment of this condition and was at first enthusiastic about its use. Five years later, he had to admit that the improvements were only temporary.

Givner[13] has studied a group of 15 patients from the viewpoint of vitamin deficiencies, and has found a lack of vitamin C, only. He has not found any improvement after its administration. He was unable to prove any disturbance in liver functions.

"Satanowsky,[2] in 1934, noted that a deficiency of vitamin A, in retinitis pigmentosa, leads to a disturbance in the regeneration of the visual purple, which may be the cause of secondary atrophy of the rods and cones; because visual purple is necessary for their proper function. Being aware of the role of the liver in the exchange of vitamin A, Satanowsky thinks that the disorders of the liver may be the cause of pigmentary degeneration of the retina."

Parker[19] has recently discussed the role of infectious hepatitis of a chronic nature in the production of night blindness. He found subnormal adaptations in six patients with severe chronic infectious hepatitis, and normal readings in six with mild hepatitis. He gave 3 of the 6 patients with the reduced dark adaptation, 40,000 units (U.S.P.) vitamin A daily, and in one week all showed marked improvement. "Two patients had jaundice during hospitalization, and there was only a slight alteration in their dark-adaptation readings, which were well within the range of error of the tests." Filatov quotes Blegvad as successfully treating hemeralopia and cirrhosis, which appeared with cancer of the liver in a case in 1923, by the parenteral administration of vitamin A.

Josephson[20] felt that "one of the fundamental features of the pathologic physiology of the disease is failure of utilization

of carotene and vitamin A." He attempted to treat retinitis pigmentosa by the oral administration of these substances, but noted no improvement. He then gave 30,000 to 60,000 units (new U.S.P.) of carotene in oil, intramuscularly, one to three times per week, and "was gratified to find a rapid and prompt response and relief of the night blindness." He stated that in all the early cases, he noted improvement within a week after starting treatment; "and dark adaptation became comparable to normal, within one to four months, normal in some cases, with a corresponding improvement in the night blindness." He did not note improvement in the more advanced cases with extensive chorioretinal atrophy. He felt that his findings indicated the failure of assimilation of vitamin A and its precursors as an etiologic factor in retinitis pigmentosa.

Litvak[2] and Verbitska have used Avital, a vitamin-A preparation, intramuscularly, without any results. In March 1938, Tscherkes[21] (also spelled Cherkes) treated one case of retinitis pigmentosa after the manner of Josephson, and reported marked improvement in dark adaptation. Litvak and Verbitska attempted the use of Avital in another case, in 1938, and noted disappearance of the hemeralopia, and improvement in dark adaptation. Improvement was still present when the adaptation was investigated two months later.

Reduction of intraocular pressure

In 1936, at a meeting of the German Ophthalmological Society, Lauber[22] reported on the treatment of optic atrophy and of retinitis pigmentosa by the reduction of the intraocular pressure. He discussed the relation between blood pressure, intraocular pressure, and intracranial pressure. He felt that if the blood pressure was lowered or low, in patients with tabes, optic atrophy tended to develop during these periods of lowered pressure; and that with a return of the pressure to normal, the atrophic process comes to a standstill. He also felt that the disastrous effects of certain antisyphilitic drugs was due to the fact that these lowered the blood pressure. He reasoned then, that two sources of treatment were available: either to raise the systemic blood pressure or to lower the intraocular pressure. He stated that it had been possible to bring the pathologic process to a standstill, in many cases, by medically or surgically lowering the intraocular pressure. At the same time the general condition of the patient was improved by the use of strychnine and various glandular preparations. Failure was due to inability to achieve this aim.

The same treatment was applied to 21 eyes with retinitis pigmentosa, most of them far advanced; in 14 eyes, vision "improved," and in more than "half of these, the visual fields too became larger." In some eyes, the improvement lasted more than six months. In five eyes, the condition has remained unchanged, after improvement for a time in one eye; in two eyes, a temporary improvement was followed by a worsening, with recurrence of the ocular hypertension. He stated that retrobulbar injections of atropine should be deleterious, due to the creation of a hypertension.

Sobanski[23] used a similar approach to the problem, employing cyclodialysis plus strychnine. He treated nine cases with seven improvements, three of which were temporary.

Levy-Wolff[24] quotes Nizetic, Spiridonovic, and Bukorov as having treated three cases by sympathectomy, plus pilocarpine or cyclodialysis for pressure. They obtained improvement only if they used the tension-reducing measures.

Permanent dilatation of retinal vessels

It was inevitable that a more central approach to the problem should be instituted. In 1930, Royle[25] reintroduced the concept of producing a permanent dilatation of the retinal vessels by employing a section of the sympathetic nerve supply to the eyes (Duke-Elder credits Abadie with having first suggested the idea in 1901). Royle's suggestion was greeted with considerable enthusiasm; and the method, if one is to judge from the literature, was attempted universally.

Various surgical approaches and techniques were employed, in an attempt to obtain a more perfect result. Royle practiced division of the branches of the first thoracic ganglion and removal of the ganglion. Caeiro, Malbran, and Balza[26] also employed a similar procedure which they refer to as "stellectomy." Meighan[27] performed a resection of the superior cervical ganglion, plus periarterial sympathectomy of the carotid artery. McKenzie[28] performed a similar procedure, plus a resection of the middle cervical ganglion. According to Whitnall,[30] superior cervical ganglionectomy should suffice to insure a complete denervation of the sympathetics here.

The underlying rationale behind any form of sympathectomy was the hope that an exaggerated vasometer tonus was responsible for the attenuation of the retinal arteries. The permanency of the vasodilation, after sympathectomy, is still a matter of dispute. While the immediate effect of the sympathectomy is vasodilation, vascular tonus is regained within a few weeks.

In his first paper, Royle reported on six cases treated with sympathectomy. Vision in the first patient was not even hand movements at four feet. Two weeks postoperatively, this man could tell time on a clock and, finally, six weeks postoperatively, he was able to read typewritten letters. Vision in the second case was 6/60; and fixation was too poor to enable a field to be taken. One- and one-half months postoperatively, the patient's vision was 6/60 and 6/36. The report on four other patients was "too early to state the results accurately," but some improvement in vision and fields was shown.

In 1932, Royle reported on 15 cases. Dr. E. A. Brearley was quoted by him as noting that the ipsilateral retinal vessels were almost invariably dilated postoperatively, and that this was permanent. Nine of Royle's cases had had loss of central fixation for years; and in none of these was permanent improvement noted.

In the other five cases seen by Dr. Brearley, four patients had maintained their improvement, and one had lost ground after an immediate response. The results in these five cases, plus a sixth, seen by another ophthalmologist, were:

Case 1. Vision was 6/60 in each eye. Fields were unchartable. Five months postoperatively, vision was 6/60 and 6/24, and fields were within 10- to 20-degree circles.

Case 2. Vision was 6/6 in each eye. There were 20- to 30-degree fields postoperatively (17 months), vision was unchanged. Fields had enlarged to almost normal.

Case 3. Vision was 6/60 and 6/18. The right field was less than, and the left slightly more than, 10 degrees. Three months postoperatively, vision had increased to 6/36 and 6/12, and then returned to original preoperative vision. The left field was slightly enlarged.

Case 4. Vision was 6/60 in each eye. Fields could not be charted. Two months postoperatively, vision was 6/24− and 6/60. Field for the right eye was 10 degrees.

Case 5. Vision was 6/60 in each eye. Fields were to the fixation point. Three

weeks postoperatively, vision was 6/36 and 6/60. The right field had increased to between 10 to 20 degrees.

Case 6. Vision was 6/24 in each eye. There were 10-degree fields. Ten months postoperatively, vision was 6/9 in each eye. Fields had increased to 18 degrees. (Case of Dr. C. Thomson.)

Royle cited the recovery of hearing in one mute; and an improvement of hearing in one case of deafness. Royle's fields are open to question, in that they show concentric enlargement as a sign of improvement. It has been my experience, as well as that of a large number of the authors quoted here, that where improvement in the field occurs, it frequently is in the direction of return of peripheral (usually temporal) seeing areas. Royle's series includes no such case, even though he has cited large improvements in some of his cases.

MacDonald and McKenzie,[28] in 1934, reported on four cases treated by sympathectomy, with the following findings and results.

Case 1. Vision was 5/60 and 6/60+1. Fields were down to fixation. Twenty-six months postoperatively, vision was 6/60 and 5/60. Fields remained unchanged.

Case 2. Vision was 6/60 and 6/36. Fields were between 20 to 30 degrees. Twenty-four months later, vision was 6/36 and 3/60. Fields have decreased to the 5-degree circle.

Case 3. Vision was 6/24 and 6/12. There were 5-degree fields. Twenty-four months postoperatively, vision was 6/24 and 6/12, and there was a slight increase in fields.

Case 4. Vision was 6/12 and 6/24. Fields were 15 to 20 degrees. Six months postoperatively, vision was 6/12 each eye, and the right field had definitely increased.

In this series, one eye definitely shows an increase in vision and field; and, conversely, one eye (case 2) shows a marked decrease in vision, postoperatively.

Campbell[29] reported one case with vision of 6/12 in each eye, and with 3-degree fields. After sympathectomy, vision remained unchanged, although there was a return of a superior seeing island in the field. This disappeared after six months.

Walsh and Sloan[30] reported three cases, in 1935, which were treated by sympathectomy. The findings in their series were:

Case 1. Vision was 20/40 in each eye. Five-degree fields were present. There was no improvement postoperatively.

Case 2. Vision was 20/50 and 20/40. Fields were 17 to 20 and 12 degrees. One month postoperatively, vision was 20/70 and 20/50. Fields were unchanged.

Case 3. Vision was 20/200 and 20/30−3. Right vision was corrected to 20/100. The patient was unable to read Jaeger type with the right eye. Left vision was J1 at 6 inches. This patient was carefully followed for a period of 14 months, and no improvement in vision was noted, despite her assertions of visual improvement. There was definite improvement in fields and in dark adaptation, but eventually there was a return to preoperative levels.

Meighan,[27] who, at the 1931 congress of the Ophthalmological Society of the United Kingdom, had reported on one case improved by sympathectomy, again reported on the same subject, in 1935. At that time, he stated that the original case had now regressed to the point where the patient was worse than before treatment. Two other cases had been similarly treated; one showed slight improvement in vision; but both showed progressive contraction of the fields. Meighan felt that this progressive contraction of the

fields indicated that the disease had not been arrested.

Gifford and de Takats,[31] in 1935, reported on six similarly treated cases.

Case 1. Vision, corrected, was 6/12 in each eye. There were 20-degree fields. Postoperatively, vision was 6/10−1, with no change in fields.

Case 2. Vision was 8/10 in each eye. Fields were within 10-degree circle. There was no change, postoperatively.

Case 3. Vision was 18/200 and 20/200. Fields showed loss of the upper half and a central scotoma on each side. Operation did not improve the condition.

Case 4. This case had previously received 10 subcutaneous injections of uveal pigment, with no change in her findings. Vision was 20/40 and 20/20−3. Postoperatively (5 to 8 months) vision was 20/40+2 and 20/15−2. Visual fields had contracted.

Case 5. Vision was 20/20 and 20/40+1. Fields were 10 to 20 degrees. Postoperatively, vision was 20/40−1 in each eye, with a decrease in the right field.

Case 6. Vision was finger counting and 20/50. There was no change after surgery.

These authors felt that their results definitely failed to confirm the enthusiastic reports in the literature. They sounded a note of caution and pointed out that one of Magitot's patients had remained dizzy and had suffered occipital headaches for months, postoperatively.

In 1933, Caeiro, Malbran, and Balza[26] presented five patients treated by stellectomy. Their results follow.

Case 1. Vision was light perception and 1/8. Fields were 5 degrees. Vision showed a postoperative improvement to 20/20 (L.E.) 11 days later. The left field was increased to 15 degrees, temporally.

Case 2. Vision was 1/8, O.U. Fields showed 5 degrees. Three months postoperatively, vision was 1/3 and 1/4; fields had increased to 10 degrees.

Case 3. Vision was improved in two months from perception of large objects to 1/20. Fields were not done.

Case 4. Vision was 1/6 in each eye. It was improved in one week to 1/3 and 1/4. There was no improvement in fields.

Case 5. Vision was: R.E., large objects; L.E., 1/8. Fields were 5 and 10 degrees, respectively. One week postoperatively, vision was 1/50 and 2/3. The left field had increased to 20 degrees.

Two of these patients (cases 3 and 4) had been previously treated for syphilis.

In 1938, Caeiro[32] again reported on the results of stellectomy. He quoted Campbell's and Meighan's good results; a claim not made by these authors, nor upheld by a review of their reports. He, at this time, also referred to three cases operated by Drs. Villegas and Pasman, who obtained "flattering" results. He did advise caution in the interpretation of results. He definitely felt, however, that "patients who have been operated on by this method have shown real improvement, and these results, whether based on quackery or on scientific principle, are eloquent."

It is probable that Caeiro did not intend the word "quackery" to be used in the American sense; but rather to denote lack of scientific rationale. Caeiro did not believe that the effect of ganglionectomy on the capillaries wears off after a short time; but quoted Diez to the effect that "experience has proved that with this operation the phenomena of vascular expansion that are obtained are persistent, or, at least, last a long time."

Caeiro divided his cases into two series. One series of 13 patients (including the four recorded above) were operated on without consideration of the degree of progress of the ailment. In addition to the four reported whose "increase in visual field and visual keenness" still persisted five years later, four had a slight improvement and four no change. The

last obtained much improvement in vision and field, "lost within six months almost all that he had gained; a slight improvement in visual keenness nevertheless persisted."

The second series included more carefully selected cases, all operated upon two years prior to publication of the article in 1938. The results in the second series follow.

Case 1. Vision was 1/3 and 1/4. Fields were 20 and 25 degrees. A month after operation vision in the left eye (operated) was 1/2, and that field had been extended to 40 degrees. Data on the right eye were not given. It was stated that examination three months later still showed improvement.

Case 2. Vision was 1/5 and 1/4; fields were 50 to 70 degrees, and 0 to 60 degrees. Five months postoperatively, vision was 1/3 and 1/2. One field remained unchanged; the other went from an original of 0 degrees temporally to an increase of 50 degrees. Three months later when the patient was examined "he was found to be doing well."

Case 3. Vision was 0 and 1/10. The field on the eye with vision showed 55 to 80 degrees, with a large central scotoma, covering 25 to 55 degrees of the central field. Examination almost three months after surgery revealed vision to be: ability to distinguish bulky objects and 1/6. There was some increase in field.

Case 4. Vision was counting fingers at 3 meters and 3/10. Fields were 25 to 50 degrees, L.E.; and contracted temporally to 50 degrees, R.E. Four months postoperatively vision was: the 3/10 eye had increased to 1/2; vision in the other eye was not given. Fields were essentially unchanged.

Caeiro concluded with the statement that four other patients had been similarly treated, with good results, but were not being reported because the period since operation had been too short.

It is worth noting that Caeiro has obtained unusually large fields on patients with poor vision. At the same time, it should be pointed out that he did not elicit any ring scotomas in his preoperative examinations. Nor did he elicit any such scotomas on examination of any of his improved cases.

Kerr,[33] in 1935, reported on the series of cases which he had operated for Dr. Louis Greene. They saw 18 patients with retinitis pigmentosa, five of whom were blind. Of the remaining 13 patients, only eight showed fields. Of these eight, three patients who had good fields obtained excellent results; and the five with gun-barrel fields obtained no results.

Greene and Kerr's first case showed a 50-percent improvement in visual acuity; and 150-percent increase in field. Their second case had vision of 20/40 and 20/70, which was improved to 20/20 and 20/30, while the fields were improved to almost normal. Their third case went from 20/100 to 20/20 in each eye, with almost normal-field returns. Their fields, also, showed concentric enlargement without the ensuing return of a ring scotoma during the period of enlargement. They had one postoperative death, occurring the next day.

Grant,[34] at a meeting of the College of Physicians of Philadelphia, in 1940, reported on the late results of cervical sympathectomy in retinitis pigmentosa. He used the high operation of carotid stripping of the internals, common and externals, with excision of the upper and middle cervical sympathetic ganglia, and the intervening nerve. Reporting on nine cases, he stated that he thought that they became worse more slowly than did similar control cases which were not operated. Spaeth, in discussing this paper, tended to agree with Grant's findings; and commented upon the tremendous variability in the fields, postoperatively. He commented

upon the number of new retinal vessels seen postoperatively.

Zaven and Govaerts,[35] in 1940, reported one case similarly treated, with no improvement. Blobner,[36] following the reports of Magitot, which were enthusiastically in favor of sympathectomy, attempted this procedure on six cases. He obtained no improvement and felt that the operation should be done away with, since it did no good and could do harm.

Karsch,[37] in 1936, attempted a critical review of all the therapeutic procedures which had been attempted in retinitis pigmentosa, from 1887 to 1935, and concluded that nothing substantial had been added to our therapeutic armamentarium. He suggested that the work of the Japanese, Sgrosso and Suganura, with roentgen therapy, be followed, as he felt that this might offer some hope.

Crisp,[38] in 1937, in an editorial on the subject of therapy of retinitis pigmentosa, quoted Doyne as having administered raw ox retina and sheep retina, without results. Clegg had tried a glycerine emulsion of sheep retina with similar negative results; while Seggel had combined injections of strychnine with the administration of cod-liver oil and liver.

In 1940, Mutch and Macky[39] commented on Dax's work with melanophore-dispersing hormones, and offered the suggestion that the B hormone, or melanophore-dispersing hormone, might offer some future hope. They were, however, unable to prove their point in several attempts on patients. Their results differed from those of Giambattista, referred to earlier in this paper.

The multiplicity of the therapeutic agents employed in retinitis pigmentosa, and their uniform failure to obtain or maintain a lasting improvement, plus the general failure of other observers to repeat successes claimed by the originators of these modes of therapy, indicate that, today, retinitis pigmentosa must still be classed as a hopeless disease.

The Filatov[1a] method

Filatov and Verbitska have introduced the concept of "tissue therapy" for the treatment of retinitis pigmentosa and other ocular diseases, as well as for some nonocular conditions. They employ the intramuscular injection of cod-liver oil, as well as implantations of liver, skin, placenta, and other tissues under the skin. They have also utilized subconjunctival implantations of placenta, with or without a scleral trephination. They have treated over 110 patients by this method. It is the purpose of this paper to outline their methods of treatment, along with some comments as to their results; especially in view of our own experience with this method.

Filatov's theory is that, when tissue has been removed from the body under aseptic conditions and allowed to stand 6 to 7 days at +2°C., certain disintegration substances are released.

These disintegration substances act as vital stimulants when the tissue is implanted or its extracts are injected. This action is not a specific one for any particular organ. He believes that it is this stimulation, and not the vitamin content alone, which produces beneficial results. Since each gram of U.S.P. cod-liver oil contains "not less than 850 U.S.P. units of vitamin A, and not less than 85 units of vitamin D," it would appear that for each cc. of the oil injected the vitamin content would not be very great. It would also appear that some other substance or substances in the material might well be credited with the results which Filatov claims.

Methods of preparation

Filatov prepared his cod-liver oil by sterilization in a boiling water bath for 15 minutes, for three consecutive days. This oil was later poured into ampules,

and heated to 60 to 70°C., two hours daily, for three days. According to Filatov and Verbitska, sterilization did not destroy the vitamins and the liver products, and bacteriologic examinations were negative. They started with 0.5 cc. doses intramuscularly, and later increased the doses to 1 cc. and then to 2 cc., given three times weekly, with the series consisting of from 10 to 24 injections. Each injection was followed by two to three minutes of local massage.

Sterilization of the oil in ampules, with the addition of nitrogen to prevent oxidation, is the safest and best method of preparation. This is the method which we now employ, using a 1-percent-procaine base to prevent or minimize the delayed reactions, which have accompanied the use of cod-liver oil injections. With this preparation, larger doses are now being used.

Filatov has also used by implantation or injection many tissues, which he feels contain these "biogenic stimulators." He has found these "stimulators" in the skin, liver, spleen, subcutaneous tissues, muscle, cartilage, and in various eye tissues, as well as in the placenta. He has also found them in various plants; for instance, in the leaves of aloe and pea sprouts, which he conserves in the dark.

The material is removed from the bodies of persons, who have died from noninfectious diseases or from trauma, within 10 hours of death. It is removed under strictly aseptic conditions and stored in a dry-sterile bottle for seven days, at a temperature of 2 to 4°C. He states that all spirochetes have disappeared by this time, and quotes his colleagues, Walter and Glaiberman, as having shown by serologic and other tests in several thousand cases that no syphilis is present. He implants small pieces of tissue, principally liver or placenta, subcutaneously, usually in the subcostal region. These subcutaneous pockets are about 3 to 4 cm. in width, and the small fragments which he implants into them are equal to about 6 cc.

We have attempted one liver implant, without untoward effects. Of the first four specimens of human liver which we obtained at autopsy, three were rejected after having been cultured in deep broth for one week. Sterile liver can be obtained in the operating room.

"Subconjunctival implantations of placenta, and other tissues, is performed as follows. The material is refrigerated for seven days. After subconjunctival injection of 2 cc. of 0.5-percent solution of novocaine, to produce edema, a small incision is made in the conjunctiva, which is undermined at least 2 cm. A segment of placenta, 12 to 15 cu. mm., is introduced deep into the channel. With his forceps, the surgeon then grasps the placenta together with its overlying conjunctiva, and holds the two tightly for a few seconds to keep the implant in place. No sutures are required. This operation can be done in the out-patient department." Filatov has similarly implanted choroid and retina, cornea, and tarsal material.

Intramuscular injections of placenta and other tissues, are prepared by Filatov as follows. "Ten parts of distilled water are added to the finely macerated tissue and the mixture is kept for one hour at room temperature, and for another hour at 70°C.; it is then filtered several times. When the protein content does not exceed 6 mg. percent, the liquid is transferred to ampules which are kept at room temperature for three days, except for one hour daily during which they are tyndallized at a temperature not above 70°C. After testing for bacteria, the ampules are placed on ice."

Application and Results of Therapy

Filatov and his co-workers have used

this therapy in practically every eye disease and have claimed improvements and cures in many of these. Some of the conditions for which they have made such claims are: keratitis, conjunctivitis, blepharitis, corneal tuberculosis, herpetic keratitis, hypopyon keratitis, corneal ulcers and opacities, keratoconus, uveitis, myopic chorioretinitis, optic atrophy, glaucoma, and trachomatous pannus. It has also been used to increase function in healthy eyes when various somatic disturbances are present. A complete table of the results of Filatov and Verbitska's treatment of cases of retinitis pigmentosa is not available, but some of their results are shown in Table 1.

TABLE 1

RESULTS OF SOME CASES OF RETINITIS PIGMENTOSA TREATED BY FILATOV AND VERBITSKA

Method of Therapy	No. of Cases	No. of Successful Results
Injections of cod-liver oil..	60	52
Subconjunctival implants of placenta.....	22	22
Subdermal implants of placenta.....	6	—
Subdermal implants of preserved skin.....	5	—
Transplantation of skin...	17	7
Total.....	110	81

Filatov and his co-workers have recorded improvements in visual acuity, fields, and in dark adaptation. Their follow-ups, as recorded, have been brief, for the most part. However, he does note one improvement lasting seven months, and another lasting 2½ years. He has charted increases in both central and peripheral fields and increases in light sensitivity of from 5 to 1,000 times.

Filatov has also used combinations of the injections (usually of cod-liver oil) and the subdermal or subconjunctival implantations. He does not discuss in detail the average duration of the "improvements;" nor does he discuss the question of a "maintenance dose." He does state that in cases in which the improvement has been lost he has been able to bring it back with another series of treatments.

DISCUSSION

A survey of the literature on the therapy of retinitis pigmentosa leaves the reader very confused. In spite of the vast array of therapeutic agents which have been presented in over half a century, the disease is still a hopeless one. The marked variation in results which different reliable observors have obtained with the same modes of therapy is difficult to explain.

As one reads the detailed descriptions of the various cases treated and of the results claimed, it becomes obvious that there is not a complete agreement on just what constitutes retinitis pigmentosa; on just what amount of "improvement" is an improvement; or on just what amount is a normal variation.*

Filatov's work on "tissue therapy" has been greeted with considerable skepticism in this country. This skepticism has been heightened by the fact that his reports have not been up to the American standards of scientific reporting either in detail or in the length of follow-ups.

I must admit that, when the subject was brought to my attention, my first reaction was one of skepticism. However, in spite of the fact that they are panacealike in nature, the claims of a man of Filatov's reputation merit study before being discounted. With that purpose in mind, a study of his methods has been embarked upon, and up to January 1, 1947, 109 patients suffering from typical or "atypical" retinitis pigmentosa have been, or are being, treated.

* The author intends to discuss this subject in a later article.

Experience with Filatov method

It is not the intent of this article to serve as a preliminary report of the work which we are doing at the New York Hospital. However, some comments concerning our experience might be of value to others desiring to attempt this work. Our therapy was begun in June, 1946, and thus far (January 1, 1947) has been concerned mostly with the cod-liver oil injections or their modifications. Some of Filatov's other methods are also to be attempted.

Originally, a small series of patients was selected, with the idea of conducting a pilot experiment to determine whether the method warranted more intensive study. Since facilities for dark-adaptation tests were not available at that time, only one patient in this series had these tests. No study of this type would be complete without dark-adaptation determinations, which are now being done. Our studies included complete ophthalmoscopic and slitlamp studies of the eyes, with visual fields, visual acuity, and tensions. Special attempts were made to elicit ring scotomas and peripheral seeing areas.

As a result of the "improvement," noted in some of the original series, a more complete study on 109 patients is now being carried on. These improvements were in the direction of increase in visual acuity, of increase in field, and of gross improvement in ability to get about in poorly illuminated rooms, and so forth.

Many of these patients stated that they noted less need for dark glasses in the sunlight and that they had less discomfort in the sun. Others commented on the fact that "things are less hazy" and that their eyes were less tired. Incidentally, a common complaint of these patients is that of "tired eyes." Whether this is due to their habit of squinting or to the rapid exhaustion of the few patches of functioning retina which they have, or to both, is not clear. This has not been stressed before as a common symptom.

One man who had to change his occupation because of his failing vision and who had formerly been an excellent badminton player, reported that he was again able to play a "good game of badminton." He also noted that he no longer needed his sun glasses when he was driving and gardening.

Another man who had had one eye enucleated stated that he had been unable to play ping pong for 12 years, because he had "missed 15 out of every 16 shots." He returned from his vacation, taken immediately after a course of 15 injections of the cod-liver oil, and stated that he was again able to play, and to "hit 15 out of 16 shots." Although some of the "improvements" were definitely psychologic in nature, one was impressed by the apparent reality of others.

In addition to an initial improvement in visual acuity, there is a tendency for the peripheral seeing area to return, or for the present one to enlarge. In our experience, this improvement has been almost always in the far temporal periphery. At this time, it is not possible to discuss fully the changes in dark adaptation, but it is our impression that dark adaptation improves in some cases. Changes of illumination cause these patients considerable suffering, and these treatments have given relief in some instances. Tolerance to light also improved in some cases. Most of the patients complain of "hazy" vision, and some have stated that this tends to clear.

Technique used

At present, a series of injections consists of initial doses of ½ cc. to test sensitivity; followed by four injections of 1 cc., and 15 injections of 2 cc. or more. Injections are given three times weekly. Obviously, June, 1946, to January, 1947,

is too brief a time to permit extensive follow-up studies. However, the improvements in the cases treated have for the most part been of fairly short duration, lasting four to six weeks or a little longer. It is quite possible that we shall find the durations of improvement to be as variable as did Filatov.

The injection of cod-liver oil is not a simple mode of therapy. We have noted a number of local and some systemic reactions. The injection is not immediately painful and does not require the concomitant use of any local anesthetic. About 48 to 72 hours after the injection, a local reaction occurs; and, in some cases, fever and a chilly sensation. The effect seems to be cumulative. Areas which had been injected a week or more before may now start to become inflamed. On several occasions, it seemed that large abscesses were forming, but in each case, the reactions responded to local applications of heat or ice. Some patients have been incapacitated for as long as one week. We are under the impression that, the more the material is sterilized, the more severe the local reactions. Men seem to be able to tolerate the injections better than do women. The local reactions, at the site of injection, have varied from slight to severe. We have used the biceps region as well as the gluteal, with reactions being no greater in the former site than in the latter.

As this work continues, an attempt will be made to determine the irritating factor. Various preparations will be tried; namely, cod-liver oil without vitamins A and D; carotene and the various isomers of vitamins A, A and D, A and E; various other fish oils and their fractions, either together or in succession; and cod-liver oil concentrates.

Filatov states that he does not know the chemical nature of the substance responsible for the "biogenic stimulation." One can only conjecture at this time; but it is important to note that the sterols are found in large quantities in most, if not all, of the substances which he mentions as sources of supply.

Discussion of experience

The first problem that confronts the investigator in this field is to determine the merits of this form of therapy. Assuming that there may be some merit in it, the next problem is one of determining the average duration of the improvement and the possibility of working out an adequate maintenance dose.

Further work, after adequately testing Filatov's methods, would then be in the direction of improving upon this means of therapy. In its present form, it is not the final answer to the treatment of retinitis pigmentosa.

An honest evaluation of any mode of therapy, which seems to offer hope of improvement in an appreciable percentage of cases, cannot be hurriedly made, unless 100 percent of a large series of cases show no improvement. When a certain number of cases do show evidence of improvement, it is important to determine whether that improvement is actual, or whether it is only within the limits of normal variation.

If improvement seems to be actual, then the true test of the value of that therapy is its ability either to maintain that improvement for an appreciable period of time, or to restore it, in case of regression, by additional administration of the therapeutic agent. Since the injections of cod-liver oil have resulted in some improvements, any preliminary report would be premature until the other qualifications—is improvement actual, can it be maintained or restored—have been more fully studied.

Until such time as its merit has been more fully determined, it would be sing-

ularly unfortunate if large numbers of ophthalmologists rush into action with this therapy and attempt to evaluate it on very small numbers of patients.

Filatov has not claimed any cure for retinitis pigmentosa. His claims for improvement run as high as 100 percent in one series (Table 1) and are certainly impressive, if they can be substantiated. In analyzing some of his case reports, it would appear that some of his "improvements" tend to fall more properly under the category of normal variations. Other results, however, are of such magnitude as to be considered as improvements.

Conclusion

A review of the various therapeutic attempts in retinitis pigmentosa has been presented, with especial attention to the details and claimed results of the Filatov method of tissue therapy. No attempt has been made to include a preliminary report of the work with this method, now being carried on at the New York Hospital. However, an attempt has been made to guide the investigator in this method, on the basis of observations made during the work at this Hospital.

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PERIPHERAL VISUAL ACUITY*

WITH SPECIAL REFERENCE TO SCOTOPIC ILLUMINATION

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The capacity of the retina to discriminate form decreases rapidly just outside the fovea and continues to diminish peripherally. Wertheim's classical data[1] show a steep drop in relative visual acuity from 1.00 at the fovea to 0.46 at 5 degrees, and then a slower drop to 0.20 at 10 degrees. An acuity of 0.20 could still be measured at 20 degrees. Ludvigh's measurements[2] roughly parallel these, the decline being even more precipitous in the paracentral region. Only 0.26 of the central acuity remained at 5 degrees, and 0.15 at 15 degrees. His data showed a relationship between peripheral visual acuity and the population of cone cells in the retina as given by Østerberg.[3] The near parafoveal region was studied intensively by Weymouth and others,[4] who showed that acuity falls off immediately and continuously from the foveal fixation point.

All these investigations were performed at high levels of illumination in order to demonstrate maximum acuity (Ludvigh used 26 to 36 foot-candles; Weymouth 18 millilamberts). No study of peripheral acuity under scotopic levels of illumination could be found. However, scotopic acuity measurements are of particular importance, because it is precisely under scotopic illumination that the peripheral retina is called upon to take over the discriminatory functions. Only in the pathologic eye with a central scotoma is eccentric photopic acuity of prime importance; eccentric scotopic acuity is of importance in all eyes. It is quite plausible that with high illumination, peripheral acuity should parallel the cone population, as was pointed out by Ludvigh. Would scotopic measurements indicate a similar parallelism with the rod population? The rod population has its maximum density close to 20 degrees peripherally;[3] the sensitivity of the retina to light is also greatest in this region.[5] However, there were several reasons to believe that peripheral scotopic acuity need not follow this pattern. In the first place, if night-blind subjects are excluded, there is little correlation between light sensitivity and scotopic form discrimination.[6] Furthermore, it has been the experience of many subjects familiar with various methods of testing scotopic form discrimination, such as were employed by the Army Air Forces, that fixation at an angle much smaller than 20 degrees gives maximum acuity in these tests. Finally, there is the theoretic reason that the maximum in light sensitivity attained at about 20 degrees is caused in part by a maximum summation of impulses from the individual rod cells, many cells in this region being connected synaptically with a single nerve fiber. This anatomic adaptation, providing maximum light sensitivity, does so at the expense of form discrimination, since the participating units in the retinal mosaic are very much larger.

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Method

A Clason Acuity Meter was used to project the visual acuity pattern on the center of a white screen in a darkened room. The form used was the Landoldt ring. Slides were constructed, each providing presentations of the ring with the break in the up, down, right, and left positions. Three slides were used, with rings 2, 6, and 12 mm. in diameter. With these slides and the continuously variable magnification the instrument provided, the diameter of the projected image could be varied from 12.5 to 245 mm.

The intensity of the projected light beam (the acuity pattern was black on white) was varied by means of neutral filters in steps of 1 log unit (10-percent transmission) and an iris diaphragm calibrated in steps of 0.3 log unit (50-percent transmission). The highest light intensity used was 9.0 log micromicrolamberts (approximately 1 millilambert). This intensity, although not sufficiently high to give maximum photopic acuity, is nevertheless well up in the photopic range, and sufficiently high to offer a basis for comparison with the lower scotopic levels in which we were primarily interested. The lowest intensity at which measurements were made was 4.3 log micromicrolamberts (0.00002 millilamberts).

The direction of fixation was controlled by means of a movable red fixation light. A 7-watt incandescent lamp, enclosed in a small housing, illuminated a 1-cm. circular aperture which was covered with a red filter and a neutral filter of density 2.0. The light in its housing was suspended behind the screen so as to illuminate one of a series of 3-mm. circular holes in the screen. The holes, with the exception of the one in use as a fixation point, were covered with white cardboard discs so as not to interfere with the projected pattern. When the desired fixation distances were greater than 35 cm. (the screen was 70-cm. wide, and fixation distances were computed from its center), the fixation light was merely suspended at the desired distance off the screen.

Most of the measurements were made in the horizontal meridian. In order to facilitate the maintainance of correct peripheral fixation, the Landoldt ring was flashed on the screen for exposures of $\frac{1}{5}$ second. The short exposure, achieved by the introduction of a photographic shutter in the illumination system, insured that the subject did not move his fixation while he was making an observation. The success of this method was attested to by the fact that the after image of the projected light always bore the correct relationship to the fixation light.

Measurements of acuity were made at the fovea and peripherally as far as 30 degrees. It was found that accurate foveal measurements could not be made with the brief $\frac{1}{5}$-second exposure, for it was never possible to be certain that an actual foveal measurement had been made. In the paracentral regions it is unimportant if a small error is made in the exact fixation angle recorded. However, even the slightest error is of significance in a supposedly central measurement. For the central measurements, therefore, the exposure of the test object was not limited; hence, the data for central measurements are not directly comparable with the paracentral measurements. An attempt was made to estimate the error introduced by not limiting the central measurements to $\frac{1}{5}$ second. It was found that at the highest brightness central acuity increased from 0.75 to 1.13 when the exposure time was increased from $\frac{1}{5}$ second to several seconds. In the paracentral areas, the difference was less marked. In peripheral areas, such as 20 degrees from the fovea, no increase at all was obtained; on the contrary, longer exposures caused the image to blur and disappear.

An experimental run consisted of visual-acuity measurements at a single retinal location for the entire range of illuminations. The highest intensity was employed first (9.0 log μμl), and then successively lower intensities down to the lowest (4.3 log μμl). Each run required approximately 45 minutes. During this time the eye of the observer became adapted to the progressively lower intensities to which it was exposed. The minimum visual angle at which 75 percent of the presentations were properly identified determined the visual acuity. Observations were made chiefly at a distance of 4 meters from the screen. For the higher intensity levels, for readings at or near the fovea, it was necessary to increase this distance to 8 or 10 meters in order to provide sufficiently small visual angles. In order to measure acuities lower than 0.022, the distance was diminished to 2 meters.

Results

The right eye of one trained observer was studied intensively, and several measurements were made on the eyes of 18 other observers. Because of the great range in light sensitivity found in a normal group (1 log unit, a factor of 10), acuity measurements for different observers might not be comparable, and it was necessary to consider the entire range of data for all intensity levels and retinal locations of each subject as a unit.

The visual acuity for subject L. L. S., measured in the horizontal meridian from the fovea to 30 degrees peripherally at 17 brightness levels, is given in Table 1. More measurements were made for the temporal retina than the nasal retina because of the occurrence of the blind spot on the nasal side. The data are all average figures for two or three runs. Visual acuity is expressed in the decimal system instead of the commonly used acuity fractions. For comparison with the usual 20/20 or 6/6 notations, the decimal notation is merely the decimal conversion of these fractions.

Measurements of visual acuity less than 0.011 were not recorded, because the visual angle, and consequently the size of the retinal image, would be so large as to render such data meaningless in terms of a regional plot of visual acuity. A retinal area 1 degree in diameter is required to record a visual acuity of 0.083, and the error in retinal localization for this acuity may be considered to be 0.5 degrees. Similarly, if the acuity were as low as 0.0083, the retinal area concerned would be 10 degrees in diameter and the error 5 degrees.

For central fixation, acuity measurements could be made down to intensity levels as low as 5.6 log μμl (0.0004 ml.). Below this intensity, the center of the projected beam containing the image of the Landoldt ring faded out. However, at 6.3 log μμl (0.002 ml.) the visual angle exceeded 1 degree, and the significance of measurements in this range as denoting central acuity is questionable. The data pertaining to this questionable range are enclosed in parentheses in Table 1. For determinations out to 4 degrees those involving visual angles greater than 2 degrees, and with implicit errors, therefore, of 1 degree in retinal localization, are also enclosed in parentheses. At 2 degrees, eccentric fixation acuity measurements could be made at intensity levels as low as 5.0 log μμl; at 4 degrees, it was possible to make measurements as low as 4.3 log μμl.

Retinal acuity contours are shown in Figure 1, where the curves for five light intensities are plotted. Only the data for the temporal half of the retina are shown; the nasal half showed fairly similar data, as can be seen in Table 1, with the exception that the apparent peak in scotopic acuity occurring at 4 degrees eccentric

fixation was not present. For the highest intensity level, the shape of the curve is quite similar to the previously recorded measurements of peripheral visual acuity. This is to be expected, since our highest intensity level was in the photopic range. At lower illuminations the central peak is not as precipitous, central acuity decreasing more rapidly than paracentral or peripheral acuity with diminution in light intensity. At intensity levels below 6.3 log μμl, paracentral acuity exceeds foveal acuity. The acuity peak occurring at 4 degrees in the temporal retina persists throughout the intensity range from 7.6 to 4.9 log μμl. In this range, therefore, it would appear that fixation 4-degrees temporally to the object viewed affords maximum acuity. (In taking the Eastman Night-Vision Test and other tests involving scotopic form discrimination this subject had found that approximately this

TABLE 1
VISUAL ACUITY FOR ECCENTRIC FIXATIONS ALONG THE HORIZONTAL MERIDIAN

A. Temporal Retina

Light-Int. Log μμl	Central	½°	1°	2°	3°	4°	5°	7.5°	10°	15°	20°	25°	30°
9.0	1.13	.75	.63	.53	.38	.35	.31	.26	.11	.083	.058	.044	.032
8.7	1.13	.68	.63	.53	.35	.33	.27	.26	.11	.083	.058	.044	.032
8.4	1.12	.68	.63	.53	.34	.30	.25	.23	.11	.083	.058	.044	.032
8.1	.88	.68	.54	.53	.32	.30	.18	.21	.10	.083	.058	.044	.032
7.9			.50	.42	.28	.26	.18	.16	.10	.083	.058	.044	.032
7.6	.65	.49	.38	.27	.20	.25	.18	.13	.10	.083	.058	.044	.032
7.3	.52	.31	.27	.22	.18	.22	.16	.11	.10	.077	.058	.044	.032
7.0	.32	.25	.20	.15	.12	.17	.13	.11	.083	.077	.058	.044	.032
6.6	.21	.12	.11	.10	.11	.15	.12	.10	.083	.061	.058	.042	.032
6.3	(.08)		(.045)	(.074)	(.066)	.12	.088	.088	.066	.050	.047		.032
6.0	(.07)		(.030)	(.046)	(.039)	.10	(.066)	.066	.050	.041	.042	.036	.030
5.6	(.028)		(.022)	(.037)	(.025)	(.063)	(.052)	.065	.050	.037	.039		.028
5.3				(.022)	(.023)	(.059)	(.047)	.053	.044	.030	.033	.033	.026
5.0				(.015)	(.021)	(.038)	(.028)	.033	.035	.026	.024		.020
4.9					(.015)	(.031)	(.025)	.023	.028	.024	.024	.024	.020
4.6						(.024)	(.014)	.023	.023	.024	.020	.016	.015
4.3						(.011)		.020	.014	.016	.016	.011	.011

B. Nasal Retina

9.0				.42		.26	.22		.11				.020
8.7				.42		.26	.22		.11				.020
8.4				.42		.26	.19		.11				.020
8.1				.42		.26	.19		.11				.020
7.9				.31		.18	.15		.11				.020
7.6				.27		.15	.12		.11				.020
7.3				.22		.14	.10		.094				.020
7.0				.18		.12	(.077)		.062				.020
6.6				.13		.093	(.066)		.057				.020
6.3				(.083)		(.077)	(.055)		.057				.020
6.0				(.056)		(.056)	(.050)		.045				.017
5.6				(.022)		(.035)	(.037)		.045				.017
5.3						(.029)	(.028)		.045				.017
5.0						(.022)	(.023)		.029				.017
4.9						(.020)			.025				.017
4.6						(.011)			.020				.014
4.3									.011				.014

Note: For all eccentric fixations along the horizontal meridian, the exposure time was one-fifth second; for central measurements, the exposure was of several seconds' duration.

fixation gave the best results.) At the lowest intensity levels, it can be seen that the contour is quite flat, visual acuity being almost constant from 4 degrees to 30 degrees.

Curves showing the relationship between visual acuity and light intensity for various areas in the temporal retina are shown in Figure 2. In order better to show the shapes of the curves, visual acuity as well as light intensity is plotted logarithmically. In order to avoid negative logarithmic designations, all acuity data are multiplied by 100 in this figure.

With central fixation and with eccentric fixations out to 30 degrees, the curves rise fairly steadily with increasing illumination, leveling off well in the photopic range. The maximum acuities diminish as the degree of eccentric fixation is increased. At 5 degrees a new phenomenon is quite evident: a distinct break occurs in the curve, indicating a division into a rod curve at the lower intensities and a cone curve at the higher intensities. A suggestion of this division into two component curves is seen at 4 degrees; the break is clearly evident at 7.5, 10, 15, and 20 degrees. It may be assumed, therefore, that sufficient rod cells are present in the retina at 4 and 5 degrees to dominate discriminatory function at intensity levels up to 8.0 log μμl (0.1 ml.), the intensity level at which the break occurs in the 4- and 5-degree curves.

Since, with central fixation, the test object was not discernible at intensity levels below 5.6 log μμl, this intensity may be taken as the foveal light threshold. The light thresholds of the paracentral and peripheral cones vary only slightly from the central threshold. It is evident, therefore, that there is a wide range, up to 8.0 log μμl, where the rod cells dominate the acuity process at 4 and 5 degrees eccentric fixation, despite the fact that cone cells must be functioning. The reason for this is that the rod cells are functioning at their maximum efficiency at illuminations which are quite high for rod cells. The cone cells, on the other hand, are functioning inefficiently at what is for them very poor illumination.

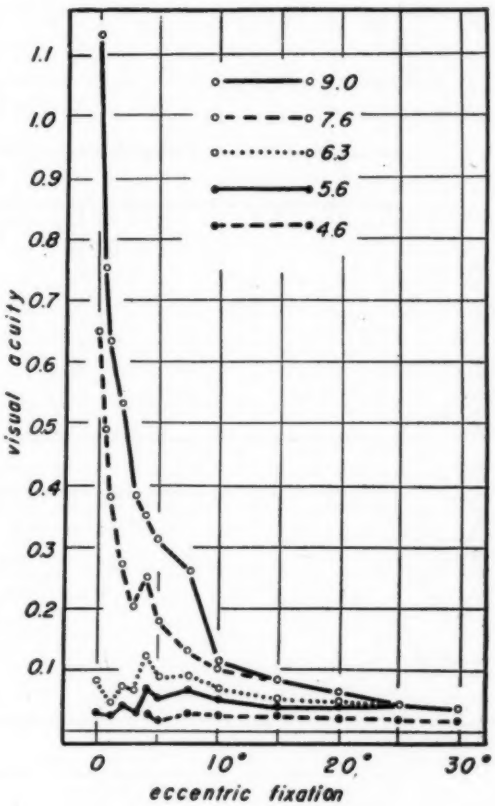

Fig. 1 (Mandelbaum and Sloan). Visual acuity measured along the horizontal meridian of the temporal retina at five intensity levels ranging from 4.6 to 9.0 log micromicrolamberts. All eccentric measurements were made with 1/5 second exposures; the central measurements were made with exposures of several seconds' duration. At 25 and 30 degrees all the curves except for 4.6 log micromicrolamberts practically run together, and are designated by single points.

That there is such an overlap between cone and rod function, rather than an intensity level at which the rods cease to function and the cones begin to function,

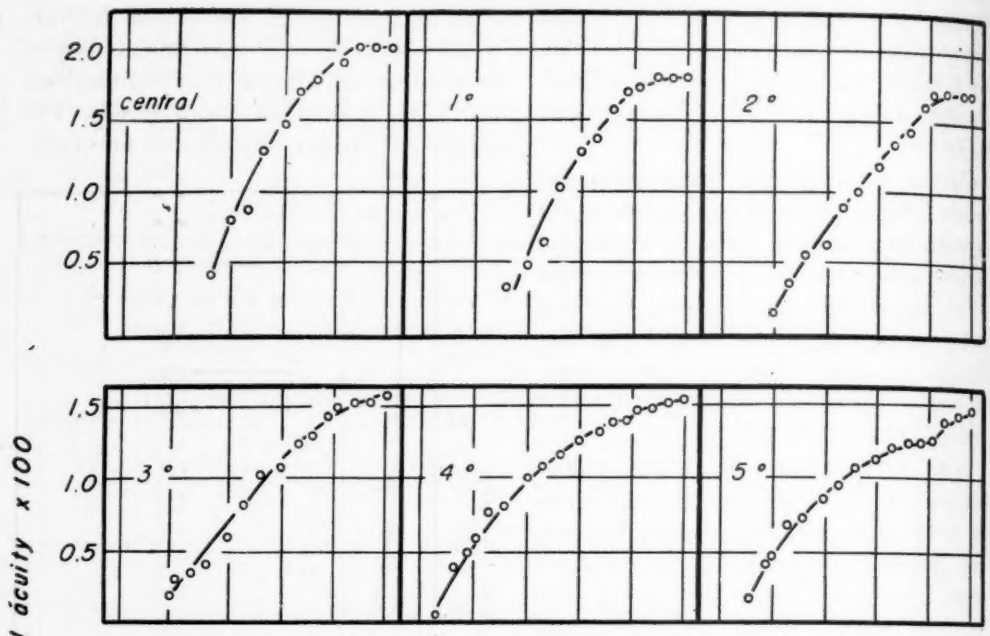

Fig. 2 (Mandelbaum and Sloan). Visual acuity curves for various locations in the temporal retina along the horizontal meridian. Visual acuity as well as light intensity is plotted logarithmically.

is to be expected from physiologic considerations, and can easily be demonstrated by other means. One of the easiest methods to demonstrate this is by viewing a spectral violet light after exposing one eye to a bright light while the other is kept dark adapted.[7] The intensity of the violet light should be approximately 1 millilambert. To the light-adapted eye, it will appear as a rich saturated color. The dark-adapted eye, however, will perceive a very pale, unsaturated color, because

here the cone sensation is diluted by the whiteness of rod sensation.

For 7.5-degrees eccentric fixation, the scotopic process dominates only to the intensity level 7.5 log μμl; for 10, 15, and 20 degrees, the break is at approximately 6.0. This shift to lower intensity levels for the break between scotopic and photopic function, demonstrated in the curves as the eccentricity of fixation is increased, is probably related to the diminution in the resolving power of the more peripheral rods. The maximum acuity of the rod component of the curve for 4 degrees eccentric fixation, occurring at the intensity level 7.9 log μμl, is 0.26 (as given in Table 1). For 5 degrees, it is 0.18; for 7.5 degrees, 0.11; at 20 degrees it is only 0.042, occurring at the intensity level 6.0 log μμl. Because of this progressive diminution in rod resolving power, the cone cells take over the discriminatory function at lower intensity levels, closer to the cone light threshold.

As the fixation becomes more peripheral, the cone curve becomes less prominent. At 10 degrees the increase in visual acuity mediated by the cones appears to be from 0.050, the peak achieved by rod function, to 0.11. At 20 degrees, the increase is only from 0.042 to 0.058. At 25 and 30 degrees eccentric fixation, no cone curve at all can be made out, and only the rod curve remains. The contribution of the cone cells in this region to visual acuity seems to be of such poor order that they fail to exceed the efficiency of the rod cells, even at high levels of illumination.

It is evident from both Figure 1 and Figure 2 that the significance of illumination as a limiting factor in visual acuity diminishes considerably from the center to the periphery of the retina. When fixation is only 1-degree eccentric, visual acuity increases from 0.022 to 0.63 as the light intensity is increased from 5.6 to 9.0 log μμl. At 10 degrees the increase is only from 0.014 to 0.11 as the intensity is increased from 4.3 to 9.0, while at 30 degrees for a similar increase in intensity, acuity increases from 0.011 to 0.032.

Because of limitations in time, it was not possible to repeat these extensive measurements on more than one subject. Sufficient measurements were made on the eye of one other subject (J. M.) to confirm the general trend of the data given by L. L. S. In addition, binocular measurements were made on 18 subjects at an intensity level of 5.8 log μμl, where the scotopic process dominates the picture. Maximum peripheral acuity for these subjects at the fixed intensity level was found to vary from 0.11 to 0.50, and occurred at retinal locations ranging from 4- to 8-degrees eccentric. Most of the subjects gave higher acuity readings when the fixation point was to the right of the test object; whether this has to do with the apparent superiority of the temporal retina and right-sided ocular dominance could not be determined. In three subjects vertical fixations were compared with horizontal ones; equally eccentric horizontal fixations gave approximately 10 percent better visual acuity.

Conclusions

1. Scotopic peripheral acuity does not parallel the rod population or the light sensitivity of the retina.

2. Maximum scotopic acuity can be achieved by 4- to 8-degrees eccentric fixation.

3. Light intensity is not as critical a factor in peripheral acuity as it is in central acuity.

4. At the lowest scotopic levels, visual acuity is fairly constant from 4-degrees to 30-degrees eccentric fixation.

5. A considerable overlap occurs between cone and rod function, the paracentral rods dominating discriminatory function at light intensities well above the cone light threshold.

6. For 25- and 30-degrees eccentric fixation, the rod cells dominate form discrimination even at intensity levels as high as 1 millilambert.

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THE EFFECT OF ELECTRIC STIMULATION ON OCULAR TENSION*

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The investigations of Prof. S. V. Kravkov and L. P. Galochkina demonstrated that the action of a weak galvanic current on the eye produces various changes in light and color perception. In view of these findings it seemed interesting to determine if stimulation with the galvanic current has any effect on ocular tension—a function which can be studied objectively. There were no data on this subject in the available literature.

Our method of investigation was as follows: The test person was adapted for 20 to 30 minutes to the usual daylight illumination of the laboratory. Tension was taken with the Schiøtz tonometer, after one instillation of 1-percent dicaine into the conjunctival sac. Then a galvanic current of 0.5 ma. was applied to the eye for 10 minutes. We used silver electrodes, wrapped in cotton moistened in physiologic saline solution. The positive electrode was applied at the temple close to the external canthus. The negative electrode was held in the opposite hand. Tension readings were taken at intervals of 4 to 5 minutes during galvanization. After the current was turned off, tension was recorded every 10 minutes for one hour. The test was performed in light adaptation and lasted about 90 minutes. The current was obtained from an accumulator, its intensity regulated by a rheostat and measured by a galvanometer. The tests were performed on six persons (mostly students).

Fundus and vision examination of these persons showed no deviation from normal with the exception of one case, which showed slight myopia. Altogether the following results are based on about 40 tests.

RESULTS

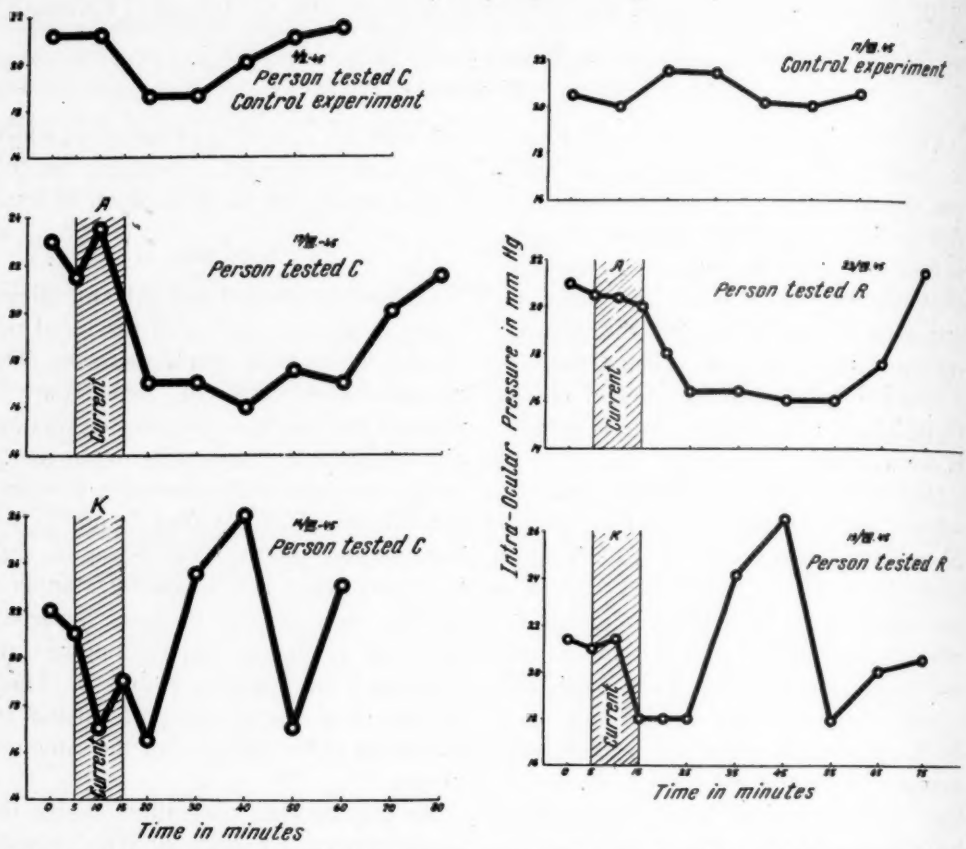
The results showed that galvanic stimulation in the intensity used produced noticeable changes in ocular tension. The changes were different, depending on whether the anode or the cathode was applied to the eye. Application of the anode to the eye invariably produced a reduction in tension from that found at the beginning of the test. There was no such constancy when the cathode was applied. In fact, in a number of cases hypertension was produced. Typical findings are illustrated in Figures 1 and 2. These graphs show the changes in tension recorded on different days for the same test person.

As may be seen from these charts, the tension curves are different after cathodic and anodal galvanization. The fluctuation in tension was more varied at the cathode (not infrequently varying 9 to 10 mm.) than at the anode. Reduction of tension at the anode was noticed in all curves. (In some cases the effect of the cathode was not so definite). Control tests were made, with the same set-up, but without galvanization of the eye. As may be seen from the curves no permanent changes in the tension were seen.

DISCUSSION

What are the processes leading to the changes in ocular tension herein described that are stimulated in the eye by action of the electric current? The mechanism of action of the galvanic current (cathelectrotonus and anelectrotonus) on the ocular tension is as yet not clear. It is pos-

* From the Laboratory of Physiologic Optics of the Helmholtz Central Institute of Ophthalmology. Director of the Laboratory, Prof. S. V. Kravkov. Director of the Institute, Prof. A. A. Kolen. Read at a scientific meeting of the Institute, July, 1945.



Figs. 1 and 2 (Zaretskaya). The influence of a constant current on intraocular pressure. These graphs show the changes in ocular tension recorded on different days for the same test person. The lined column represents the time of galvanization on one day with the cathode, and on another day with the anode. A, identifies the test with the anode to the eyes. K, with the cathode.

sible that its effect on tension can be attributed to changes in the potassium-calcium balance.* These changes, according to the literature, take place during electrization of living tissue and may lead to profound changes in the metabolism of the cell.

It is interesting to mention in connection with our data Zondek's work, which shows that the physiologic action of potassium is similar in effect to stimulation of the parasympathetic vagus nerve and that of calcium simulates the stimulation of the sympathetic.

Further investigation in this field may reveal that the reaction of intraocular pressure to electric stimulation may have diagnostic and, perhaps, therapeutic significance. Investigations on the effect of galvanism on intraocular pressure and on the pathogenesis of these phenomena will continue.

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* Univalent potassium ions go to the cathode faster than do the bivalent calcium ions. As a result of this, the number of potassium ions relative to the calcium ions increases at the cathode, and diminishes at the anode.

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OCULAR MANIFESTATIONS OF MUMPS

A CASE OF MUMPS KERATITIS

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According to Parran,[1] mumps ranked next to venereal diseases as the most disabling of the acute infections among recruits of World War II. It is essentially a childhood disease. When present in young adults, the manifestations are much more serious. It has been estimated that in World War I, about four million man hours were lost by military personnel because of mumps. Statistics are not yet available on the manifestations and disability produced by mumps in this war.

In 1934,[2] the infectious agent of mumps was found to be a filterable virus. By injecting the saliva from patients in the early stages of the disease into Stenson's duct of monkeys, Johnson and Goodpasture were able to reproduce the disease. They were then able to reproduce the disease in human children by spraying the buccal mucosa and instilling into the nostrils the virus taken from the parotid glands of the monkeys.

The portal of entry of the mumps virus seems to be the nose and mouth,[3] although Philibert[4] believes that the portal of entry is possibly the conjunctiva with lodgement of the virus in the brain. When the virus is of low virulence, a slight and transient secondary reaction of the meninges occurs. When the virus is more active, clinical encephalitis is produced. He states that the virus is finally eliminated by the salivary glands.

Apparently the virus is transmitted by droplet infection upon direct contact. The incubation period is about 18 days, the disease becoming communicable about 24 hours before the onset of the first symptoms. One attack usually produces lifelong immunity. Both sexes are affected equally. Mumps is endemic and can occur at any time, but the incidence is usually increased during the winter and spring. Mumps is now considered a systemic disease, probably a generalized infection of the blood stream through which the virus travels to reach the involved organs. No method of producing active immunity exists other than by acquiring the disease in its natural form.[5] The varieties of extraparotid manifestations may precede, accompany, or follow the onset of the parotitis.

Enders[6] was interested in establishing a test for susceptibility so that in the event of an outbreak of mumps, a large number of nonsusceptible contacts would not have to be quarantined. He found antibodies in 92 percent of the sera of those giving a positive history of mumps, and in 50 percent of those giving a negative history. He concluded that one half of those giving a negative history may have had a silent infection at one time or another. Because the complement-fixation test was too laborious, that author sought another test to determine immunity and injected a diluted heat-inactivated suspension of infected parotid glands of monkeys intradermally. In nearly 100 percent of those giving a positive history of mumps, an erythematous reaction occurred after 24 to 48 hours at the site of injection. Enders concludes from the results obtained that a positive skin reaction indicates a previous infection with the virus; whereas, failure to react signifies, in most instances, potential susceptibility.

The council on Pharmacy and Chemistry,[7] in its preliminary report, stated that human, convalescent, mumps serum

seems to be of therapeutic value in the hands of some investigators and induces some degree of passive immunity. Other investigators found the results less certain.

The recent work of Stokes[8] and his coworkers on the use of formol-inactivated suspension of mumps virus as a vaccine against mumps is encouraging.

The manifestations of mumps in order of their frequency are: orchitis, oophoritis, pancreatitis, mastitis, and dacryoadenitis. Other less frequent manifestations are thyroiditis, bartholinitis, prostatitis, meningitis, encephalitis, and neuritis of the cranial nerves. The ocular manifestations are dacryoadenitis, conjunctivitis, scleritis, uveitis, keratitis, optic neuritis, retinitis, and ocular palsies.

Ocular manifestations of mumps

With our present knowledge of the pathogenesis of mumps, it is safe to assume that ocular manifestations may occur without any other signs or symptoms; therefore, a description of some of the more common ocular manifestations would not be out of place. Most textbooks on ophthalmology fail to mention all the manifestations of mumps. When they are mentioned, there is very little description of the clinical manifestations.

Villard[9] believes that dacryoadenitis is the most common ocular manifestation of mumps. It is almost always bilateral, nonsuppurative, and appears suddenly with sharp pains in the entire area of both orbits, radiating to the temples and forehead. Edema, especially in the external portions of the upper eyelids, and redness occur almost simultaneously with the onset of the pain. There is marked chemosis of the bulbar conjunctiva which usually herniates between the eyelids. The cornea is uninvolved. Palpation reveals a cartilaginouslike mass, generally elastic, and painful in the region of the lacrimal glands. After several hours the symptoms begin to abate, with complete resolution of the inflammation of the glands in from several days to several weeks. Warm compresses is the only therapy advocated.

In the absence of any secretion, Villard states that mumps conjunctivitis is really a mild form of dacryoadenitis, involving the glandular acini present in the conjunctiva. Sendral[10] reported a case of bilateral dacryoadenitis that preceded the onset of parotitis in a 10-year-old girl. This patient also developed mastitis and oophoritis. At first glance, a diagnosis of suppurative or gonorrheal conjunctivitis suggested itself until the lids were separated, and the absence of suppuration was noted.

There is no characteristic clinical picture of the iritis and iridocyclitis following mumps. All the cases reported cleared up without any sequelae, and were treated only locally with atropine.

Optic neuritis occurs in two forms; the retrobulbar type and neuroretinitis. In the retrobulbar type, complete recovery is the rule. In the neuroretinitic type, secondary optic atrophy may result. The retrobulbar type of neuritis is less common than the neuroretinitic type.

Young[11] reported a 10-year-old patient who showed optic neuritis with swelling of the nerve head 13 days after an attack of mumps. Vision dropped to nil following treatment with lactigen and mercurochrome, and then gradually returned to 6/6 (partly) in each eye. The visual fields were normal for a 10-mm., white test object. The nerve heads showed marked pallor.

Swab's[12] case of encephalitic optic neuritis resulted in postpapillitic atrophy of the nerve heads. Onset of the neuritis was 37 days after mumps for the right eye, and 46 days after mumps for the left eye.

Drainage of the spinal fluid was recommended as a therapeutic procedure by Hubbard. Powell and Dunlap[13] reported two cases of optic neuritis with complete recovery. Case 1 occurred three weeks after the onset of the parotitis. There was questionable vision in each eye. Following the use of artificial-fever and foreign-protein therapy, vision in each eye returned to normal five months after the onset. The second patient who developed visual difficulties, one month after an attack of mumps, also had a paralysis of accommodation. The visual acuity, accommodation, and visual fields gradually improved to normal. These authors emphasize the necessity of investigating cases of visual disturbances following mumps.

Butler and Wilson[14] observed two cases of ocular paralysis following mumps. The first patient was a nine-year-old boy with complete paralysis of accommodation following an attack of mumps three weeks earlier. Recovery was complete. The second patient was a 12-year-old boy who had mumps 30 days before the onset of a complete third-nerve paralysis of the left eye. Two days later the external rectus became paralyzed. The superior oblique did not become involved. Eight months later, internal ophthalmoplegia and paralysis of elevation were still present, along with a slight weakness of convergence and abduction.

Keratitis due to mumps

Keratitis due to mumps is exceedingly rare. Villard[9] collected only three cases from the literature, two of which were ulcerative, healing with a central leukoma and producing a marked diminution of vision. The third case was an interstitial type of keratitis with complete recovery.

Danielson and Long[15] were able to find only seven cases of mumps keratitis in the entire literature, and added one case of their own. So uniform was the clinical appearance of the cases reported, that the authors considered mumps keratitis a definite clinical entity. The onset usually occurs with redness of the bulb and lacrimation from about 2 to 11 days after the onset of the parotitis. Pain is very slight or absent. Within a few days, a diffuse keratitis develops, producing a marked clouding of the cornea. Marked reduction of vision follows. The pupil reacts to light, and also dilates maximally with atopine. Uveitis or synechias have not been observed. Vascularization of the cornea is absent, and complete recovery with unimpaired vision occurs in from one to four weeks. All cases have been unilateral, either eye being involved. Lippmann[16] added another case of mumps keratitis making a total of nine known cases. The rapid onset of the opacity, involving the entire cornea, which reaches a high degree of density with corresponding loss of vision and shows complete clearing without scar formation, has been stressed by him as differential diagnostic signs.

To help establish mumps keratitis as a definite clinical entity, I wish to report a 10th case.

Case report

History

P. E. L., an aviation cadet, aged 26 years, was admitted to an army hospital on July 27, 1943, complaining of pain and swelling in both parotid regions of two days' duration associated with some malaise. On the day of admission, a burning sensation of the right eye and blurred vision were experienced. Examination by the ward surgeon revealed a conjunctival injection with some apparent cloudiness of the right cornea, and a bilateral, somewhat tender swelling of the parotid

glands. Two days after admission, I was called to see the patient, who then complained of some pain, photophobia, and lacrimation in the right eye associated with marked reduction of vision, all of two days' duration. Vision was limited to hand movements at two feet in the right eye, and was 20/20 in the left eye.

Ocular examination

Examination of the right eye revealed a two-plus, mixed injection of the bulbar conjunctiva. The cornea was uniformly hazy, giving it a milky appearance. It did not stain with fluorescein. With loupe magnification and oblique illumination, deep interlacing linear opacities could be made out. Descemet's membrane showed some folds. The anterior chamber and iris appeared normal. The pupil did not appear irregular nor did it differ in size or reaction to light from its fellow.

Further ocular examination was accomplished at the eye clinic to which the patient was brought after proper facial draping to prevent the spread of the mumps. Slitlamp examination revealed normal surface epithelium. The linear opacities were localized in the substantia propria, most numerous in the posterior one third. Definite wrinkling of Descemet's was present. There were no keratic precipitates. Vascularization, either superficial or deep, was absent. Fundus details could not be made out. The left eye was entirely normal. The diagnosis was acute keratitis complicating epidemic parotitis. Hot compresses were applied, and a 1-percent atropine solution was instilled 3 times daily. The pupil dilated readily with atropine. It was noted that the dilatation was maximal and that the pupil was uniformly round.

Course of the disease

The next day, July 30th, the cornea was still diffusely hazy, but there was definite clearing at the periphery. There was no change in the intensity of the bulbar injection. The pupil was widely dilated. The same treatment was continued. Inspection of the right eye 24 hours later showed marked improvement, the opacity being now limited only to the central portion of the cornea. The injection of the bulb had also decreased. Because of the rapid clearing of the corneal opacity, the use of intravenous typhoid was withheld. Clearing of the remainder of the cornea continued steadily. On August 5th, nine days after the onset, the eyeball appeared perfectly white; the cornea was entirely transparent and was essentially negative to slitlamp examination. Vision was 20/20. Further medication was discontinued. The patient was discharged back to duty on August 10th, at which time another ocular examination was made on the right eye. All findings were normal.

Conclusion

Mumps is now considered to be a systemic virus disease which affects the various organs through the blood stream. The ocular, as well as some of the systemic, manifestations may precede, follow, or accompany the onset of the parotitis.

Keratitis, the rarest of all ocular manifestations of mumps, is a definite clinical entity as established by the similarity in the onset, clinical appearance, and course of the nine cases previously reported, and the one just added by me. The term, Mumps Keratitis, is advocated.

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PRIMARY GLAUCOMA AND THE PITUITARY-DIENCEPHALIC SYSTEM*

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It is a well-known fact that in many respects knowledge of the pathogenesis of primary glaucoma is still vague. Among other causes, endocrine factors are believed to be responsible for its occurrence —thyroid,[1] pituitary,[2] cortico-adrenal system,[3] and gonads.[4] In recent years we have had the opportunity of examining 22 cases of primary glaucoma which were referred to us for internal examination with the view that there might be a possible connection between the ocular condition in these cases and the diencephalon or pituitary-diencephalic system. Such a relationship has already been established between other ocular diseases and the pituitary body or the diencephalic-pituitary system (retinitis pigmentosa, Zondek and Koehler[5] and Zondek and Wolfsohn;[6] the Lawrence-Moon-Biedl syndrome; and pituitary-diencephalic exophthalmos, L. P. Daniels,[7] Zondek and Ticho[8]). We made tests of the carbohydrate and water metabolism, basal metabolism, blood cholesterol, and the osseous structure of the skull. A few characteristic cases will be reported in brief.

CASE REPORTS

Case 1. C. S., aged 15 years, gave the history that his mother was suffering from primary glaucoma (case 2). Although he had just been seen by an oculist who found increased ocular tension, the patient made no complaints. He was very tall—just over six feet—with a moonlike face. Pubic and axillary hair growths were normal. There was no facial hair growth. Visceral organs were normal. Blood pressure was 95/70 mm. Hg.

Laboratory findings showed: blood count and urinalysis, negative. Glucose-tolerance test at half-hour intervals showed: 122, 118, 100, 107, 90, and 114 mg. percent (hyperinsulinic curve). Volhard test: after having drunk 1,000 cc. water, the patient voided 800 cc. urine within the next two hours. X-ray studies showed the sella turcica to be normal; the skull to be extremely rarefied, and the galea to have an appearance almost like cotton wool; thus, giving an impression of the beginning stages of Paget's disease of the bone. The eyes showed primary glaucoma.

Case 2. Mrs. E. S., aged 39 years, was the mother of the boy in Case 1. She had had a rather large goiter since childhood. For the past few years, the patient had seen rings in front of her eyes. Her voice was said to have grown hoarse and deep lately. She had a tendency toward pronounced oscillations in weight; for example, gain in weight had been 17 to 18 pounds in the last month. She was subject to moods of depression accompanied by voracious hunger and feelings of anxiety. She was masculine in type and showed hirsutism. She had a rather large parenchymatous goiter.

Examination on admission to the hospital showed the visceral organs to be normal. Blood pressure was 110/70 mm. Hg. Urinalysis and blood count were normal. Glucose-tolerance test at half-hour intervals showed: 80, 142, 117, 107, 96, and 75 mg. percent; glycosuria occurred at the time of the second and third readings. A second glucose- tolerance test at half-hour intervals gave this reading: 80, 117, 80, 62, 78, and 67 mg. percent; gly-

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cosuria occurred at the time of the second, third, and fourth readings (traces, 1 percent, and traces). The sella turcica was widened in the anterior-posterior diameter. There were vascular furrows in the skull. Blood cholesterol showed 266 mg. percent. The basal-metabolism rate was a minus five. The eyes showed primary glaucoma.

Case 3. Mrs. S. L., aged 42 years, in giving the family history said that three brothers and three sisters out of nine siblings were suffering from glaucoma. She had had four operations for glaucoma, one on the right eye and three on the left eye. Glaucoma attacks occurred just before menstruation, which is regular. She had always been fat, and during the past months had been gaining. She suffered from migrainelike headaches.

On admission to the hospital, her weight was 191.4 lbs. She had a moonlike face. Striae were not present. The pulse rate was 60. Blood pressure was 120/80 mm. Hg. The visceral organs were normal. Urinalysis and blood count were normal. The glucose-tolerance test was: 68, 129, 120, 118, 169, and 230 mg. percent; no glycosuria. The Volhard test was normal. Basal-metabolism rate was a plus 29. Ten days after menstruation there were 500 mu of estrone in the urine. The sella turcica was of normal size and shape. There were increased vascular furrows in the skull. The ocular findings showed primary glaucoma.

Case 4. Mrs. L. R. had suffered from migraine since childhood. Menstruation was somewhat irregular, and she had always been moderately fat.

Examination on admission to the hospital showed moderate obesity. The visceral organs were normal. Blood pressure measured 125/70 mm. Hg. Urinalysis and blood count were normal. Readings at half-hour intervals in the glucose-tolerance test were: 117, 145, 121, 138, 110, and 163 mg. percent (diabetic type); no glycosuria. Two blood-cholesterol readings were: 350 mg. percent and 266 mg. percent. The Volhard test showed: after drinking 1,000 cc. of water, the patient eliminated 1,220 cc. of urine within the following two hours. The basal-metabolism rate was a plus two. X-ray studies of the skull showed the posterior clinoid processes to be poorly defined. There were increased vascular furrows in the skull and extreme rarefaction of the osseous structure. The eyes showed primary glaucoma.

Case 5. Miss E. N., aged 30 years, had a negative family history. For several years, there had been a progressive enlargement of the prominent parts of the patient's body—nose, lips, tongue, hands, feet, and so forth. She had been suffering from an increasing number of headaches. Menstruation had become irregular and then had ceased entirely about a year earlier. About three years before, the patient had had X-ray irradiation of the pituitary gland. A few months after this, her vision became worse and she complained of green rings in front of her eyes. She was treated with pilocarpine and eserine. She is subject to moods of depression.

Upon admission to the hospital, she showed obesity. Her face was puffy and had a bluish-red tint. Her lips were thickened, and her tongue, feet, and hands enlarged. Her voice was hoarse. The pulse rate was 60 to 72. Blood-pressure reading was 140/70 mm. Hg. With the exception of the heart, which was enlarged to the left and gave dull sounds, the visceral organs were normal. The tendon reflexes were sluggish.

Laboratory findings gave the following results. Blood count and urinalysis were normal. The glucose-tolerance-test readings were: 98, 110, 120, 134, 116, 134, and 134 mg. percent. Blood cholesterol showed

169 mg. percent. In the Volhard test, after the intake of 1,000 cc. of water, 320 cc. of urine were eliminated in the following four hours. The basal-metabolism rate was a plus 16. Electrocardiogram readings were normal. There was an enlarged sella turcica, unilaterally excavated; the galea was very thick; there were increased vascular furrows in the skull (pituitary tumor). The eyes showed primary glaucoma.

Case 6. Mrs. F. S., aged 62 years, gave a negative family history, and her previous history was irrelevant.

Examination upon admission to the hospital showed obesity. She had cyanotic lips. Her pulse rate was 106. The blood-pressure reading was 190/110 mm. Hg. The visceral organs were normal, the heart and aorta were not enlarged. Urinalysis and blood count were normal. Readings for the glucose-tolerance test were: 115, 181, 203, 206, 225, and 181 mg. percent; glycosuria was present at the time of the fourth, fifth, and sixth readings (1, 2, and 3.4 percent). The Volhard test was normal. Blood cholesterol was 308 mg. percent. The basal-metabolism rate was plus 18. An X-ray film of the skull showed a pituitary tumor which had penetrated into the sphenoid sinus. Ocular examination showed primary glaucoma in the right eye.

Case 7. Miss B. N., aged 45 years, said that her mother had glaucoma. The patient was first seen by us seven years ago. At that time, she said that menstruation had ceased about one year earlier. Her hands and feet had grown larger, and her face had coarsened. She complained of splitting headaches and was subject to moods of depression. Five years ago, X-ray irradiation of the pituitary gland caused the headaches to subside. After the lapse of a year, however, the patient began to see rings in front of her eyes. Following this symptom, a diagnosis of glaucoma was made. Since then she has been under the constant care of oculists.

Examination at this time showed her to be of the acromegalic type. She had enlarged hands, feet, lips, and tongue; her arms and legs were bulky. With the exception of a slightly enlarged left ventricle of the heart, the visceral organs were normal. Blood pressure showed 120/80 mm. Hg. Apart from traces of albumin, the urinalysis was negative. Blood count was normal. Glucose-tolerance test showed: 111, 151, 118, 125, 129, 111, and 117 mg. percent. Blood cholesterol measured 262 mg. percent. In the Volhard test, after the intake of 500 cc. water, 80 cc. urine were voided within the following four hours. The basal-metabolism rate was a minus two. There was bone atrophy around the sella turcica, which was uniformly enlarged. There was marked vascular congestion. The eyes showed primary glaucoma.

Discussion

Among the 22 cases of primary glaucoma studied, 16 cases gave various combinations of evidence which pointed to disturbances in the pituitary-diencephalic system. Obesity, menstrual troubles, disordered carbohydrate metabolism, a tendency toward water retention, deviations of the basal-metabolism rate from the normal average, decalcification or atrophy of the bony skull (particularly around the sella turcica), occasionally calcification also, congestion of the meningeal vessels, and a rise in blood cholesterol were among the signs noted.

It should be emphasized that abnormally high blood-cholesterol values were frequently found in processes localized in the pituitary-diencephalic region (Zondek and Ticho[8]).*

It is noteworthy, too, that pitui-

* The author has recently learned that Schmelzer also reported upon the rise in blood cholesterol in cases of primary glaucoma (Med. Welt, 1943, v. 44 and 45, p. 779).

tary tumors were present in 6 of these 16 cases, and that two of the patients with pituitary tumors presented the characteristics of acromegaly. In 6 cases out of our total number of 22 cases, there was no evidence of any pituitary-diencephalic disturbances. This fact may indicate that the pathogenesis of primary glaucoma cannot be viewed from a common aspect. On the other hand, it is impossible to ignore the findings established in the majority of our cases.

It would appear from previous investigations—at least in a number of cases of primary glaucoma—that two etiologic factors are of special importance:

1. Abnormal vascular function.
2. Hydration of the corpus-vitreum tissues.

In abnormal vascular function, both the abnormal narrowing (spasm and sclerosis) of the afferent vessels of Schlemm's canal (according to Friedenwald[9] this delays the flow of blood through the canal and causes a decrease in water-reabsorption rate) and abnormal dilatation of the vessels (this causes an increase of vascular permeability and, therefore, an increase of intraocular fluid) play an important part.

It might be added that the lowering of intraocular pressure in diabetic coma, a condition known to be associated with dehydration, may be considered as a proof for the role played by the ocular fluid content in regulating ocular tension. Both abnormal circulation and the tendency toward tissue hydration may well be explained by disordered pituitary function. It is up to future research to demonstrate whether, and how, antidiuretic hormones can get into the eye.

In 1935, one of us (H. Z.[10]) reported upon a syndrome for which the term "diencephalopathy" was suggested. This syndrome not only comprises certain metabolic disturbances pointing to the diencephalon but also changes in the osseous structure of the skull (either abnormal calcification or abnormal decalcification), psychic anomalies, and ocular disorders (retinitis pigmentosa).

Recently Zondek and Ticho[8] showed that some types of exophthalmos are probably of pituitary-diencephalic origin. Even before this work was published, other authors had drawn attention to the possible part played by the thyrotropic factor of the anterior lobe in the genesis of this disease. Among the etiologic factors in this type of exophthalmos, hydration and edema of the external ocular muscles are known to be of importance. The assumption that the antidiuretic factor of the posterior pituitary lobe may be responsible for the occurrence of local water retention does not, therefore, appear to be far fetched.

It is not unreasonable to assume that both pituitary-diencephalic exophthalmos (as designated by Zondek and Ticho) and some types of primary glaucoma may be included under the heading "diencephalopathy." At least, this assumption is not unreasonable in so far as anomalies of circulation or of water-salt metabolism may result in different clinical manifestations in the eye. As with exophthalmos, it should be possible to define certain types of primary glaucoma as "pituitary-diencephalic glaucoma."

The fact that the origin of a number of cases of primary glaucoma can be traced to tissue hydration (corpus vitreum) points to the therapeutic effect of dehydrating measures. It may be assumed that the beneficial effect of thyroidin recorded by Hertel[1] is to be thus interpreted. A few patients to whom we have given mercurial diuretics have stated that they have had at least subjective relief. This hint should be checked by oculists, since it may serve as a supporting measure in situations in which acute action on the increased intraocular pressure is required.

Summary

Sixteen out of 22 cases of primary glaucoma showed, in varying degrees, changes which pointed to the pituitary-diencephalic system. Six of these 16 cases presented pituitary tumors. No pathologic findings could be obtained in 6 of the 22 cases. The question as to how far pituitary hormones (particularly of the posterior lobe) or pituitary-diencephalic factors are to be held responsible for the occurrence of primary glaucoma is discussed. "Pituitary-diencephalic" glaucoma is the term suggested to designate those cases of primary glaucoma which exhibit the pituitary-diencephalic symptoms herein described. Such a definition would be analogous to that for the syndrome of pituitary-diencephalic exophthalmos.

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THE PSYCHOLOGY OF THE SQUINTER*

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Although this paper is entitled "The Psychology of the Squinter," it deals mainly with the psychology of the orthoptic treatment of the squinter, and this might be a more appropriate title.

Much has been written on child psychology with emphasis on the psychology of the handicapped and exceptional child. Certainly, I can add nothing to what is already in the literature concerning the psychology of squinters, but I can emphasize the main characteristics of the squinter, and the psychology which should be used by the technician, the parents, and the teacher.

Orthoptics is defined as a method of teaching or restoring binocular single vision by means of graded exercises. It is an educational process, just as much as teaching mathematics is an educational process. To be successful, any teacher must understand something of the psychology of her pupils as individuals. Binocular single vision is a high degree of skill, and if we are to teach it successfully, we must realize that our pupils are individuals with many complex psychologic problems which can, to a great extent, account for their trouble.

Our aim is to obtain a cosmetic and a functional cure; that is, the patient's eyes must not only look straight, but he must have comfortable single binocular vision which he can use in daily tasks. Anything less than this is, strictly speaking, an orthoptic failure. However, to quote Dr. Costenbader: "A lesser grade of cure is better than a cross-eyed child. We should pick the cases for prolonged orthoptics in which there is the greatest chance for a true cure, and make the other patients happy by simply making them look better."

We must always remember that we are treating individuals and not just a pair of eyes, a convergence excess, or a case of amblyopia ex anopsia. Each patient is an individual problem, a challenge; no two are just alike. It would be simple to classify each patient as to his type of squint and treat him according to a set rule, one step following another. By observing and treating many patients, it is true that it has been possible to establish a pattern of technique for treating each type of squint, but the individual squinter will achieve each skill in his own way. We must first understand the difficulty of the individual and base treatment along those lines best suited to him, in order for him to achieve his goal of comfortable binocular single vision.

Very few young squinters ever complain of visual confusion. They may alternate the fixation, suppress the vision of one eye entirely, or develop anomalous retinal correspondence, and still experience no ocular discomfort. Until they reach the age when the lack of binocular single vision is felt, or until they are made aware that they have crossed eyes, they are quite happy.

The squinting person, child or adult, is as physically handicapped as one who must wear braces or use crutches. The squinter becomes aware that he looks different from others as soon as he comes in contact with children of his own age, usually when he starts to school. It is now customary for children to enter nursery school at two or three years of age. Fortunately, at this age, they are usually very

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*Read at the meeting of the American Association of Orthoptic Technicians at Chicago, October 14, 1946.

self-centered, and not observant or critical of one another's appearance. Personal pleasure is their main interest in life. For this reason, the advisability of straightening a child's eyes before he reaches school age cannot be too strongly emphasized. If at the age of six he can start his social contacts with other children with straight eyes, he is spared much unnecessary suffering. The infant squinter, if he is wearing a patch, is usually impervious to the glances and comments on his unusual appearance. One mother told me that she had never realized there were so many thoughtless people in the world until her child wore a patch. Few would ever think of mentioning a deformed limb or a disfiguing mark to the unfortunate possessor or to his sensitive parents, but on seeing a child with a patch, curiosity overcomes them and they want to know if the child is blind in one eye, or how he hurt it. The majority of young squinters are very nervous and sensitive, and these well-meant inquiries make them more conscious of their eyes. The young squinter can be spared a great deal of heartache if he can start to school with his eyes at least cosmetically straight and with his period of occlusion, if that is necessary, behind him.

There is not a great deal that one can do for the infant squinter with orthoptics beyond diagnosing the type of squint and occluding, if that is necessary. His mind is not yet ready for the concentration and will to learn that are absolutely necessary for successful fusion training. If we are to accomplish anything with him, it must be in the guise of play.

The first few visits of the infant squinter are spent in becoming acquainted with him and in convincing him that he is in friendly hands; that he is not going to be hurt. It is usually possible to obtain enough information to determine the type of squint and what treatment: surgery or orthoptics—or both—will be needed. We can get a fairly accurate idea of the vision with the illiterate "E" chart, picture charts, or the Bailey test. A young child always likes to hold a light and look at it through red and green glasses. We can get a prism and cover measurement fairly accurately, if it is done quickly. In the same way, it is also possible to determine the fixing eye, and get a rough idea of the ocular motility. The child always likes to see the movies, and we can get an objective setting, at least, if the flashing is done very quickly. However, no matter how enthusiastic and coöperative the child is, if he is less than four years old, it is impossible for him to concentrate on one target for more than a few seconds. He simply lacks the power of concentration that comes when he is a little older.

A four-year-old accommodative squinter can be taught to hold his eyes straight but only if he is an exceptionally bright child. Any attempt to force his undeveloped concentration is likely to result in a serious emotional upset and cause him to nourish a deep-seated hatred for any form of eye exercises, which will make it impossible to obtain future coöperation, even though he will then be old enough to learn binocular single vision. At six years, the child has developed some ability to reason. Then, success lies in making him want binocular single vision. Although he is capable of learning to hold his eyes straight in daily tasks, he will never be able to do it unless he desires straight eyes and is willing to work to achieve that goal.

Groups of squinters

Squinters can be divided into four groups:

1. Can the patient straighten his eyes? If not, then orthoptic training is useless as the error is anatomic and can be corrected only by surgery. After the eyes have been set reasonably straight, post-

operative fusion training can be started.

2. Can the patient recognize his errors? Binocular single vision is certainly a very difficult skill to learn, and it stands to reason that a child with very low intelligence is not capable of learning it. He must understand what is required of him, in order to carry out even the simplest of exercises.

3. Can the patient be comfortable while holding his eyes straight? If he can fuse, but his imbalance is such that fusion is always a distinct effort, he will not use it for casual seeing. In cases such as this, surgery combined with orthoptics gives the best results. In every case, the patient must have comfortable visual habits. If he is not comfortable with binocular single vision, he will revert to his old, incorrect habits of seeing.

4. Does the patient want to use his eyes correctly? Every squinter who has been successfully cured with orthoptics belongs in this class. Without a strong desire for straight eyes, and a determination to have them, sufficient coöperation to effect an orthoptic cure cannot be obtained. Fusion has been defined as the satisfaction of a desire for a single image. If fusion failed to develop spontaneously, the patient must desire it, in order to obtain it. A child must have reached the age of readiness for learning binocular single vision before he can do so. He must have reached the age of readiness for learning any particular skill, if he is to achieve it. Most children start to grade school at the age of six because that is the usual age of readiness for organized learning. It is also the age at which he becomes aware of other people and begins to care what others think of him.

Six-year-old squinters

The unfortunate child who has to attend school with a noticeable squint or wears an unsightly patch has a great deal of self-adjusting to do. He is usually oversensitive and high strung. At the age of six, a child is not able to reason that he is just as capable as others, although he does not look like them. His mental development is not sufficient to make him consider the feelings of others less fortunate than himself. The squinter has to bear taunts of "cross eyed," "four eyes," if he has to wear glasses, and many other equally uncomplimentary names. Because of poor vision, he may fall behind in his school work.

Reading is a new and highly difficult skill that he must learn, and one which will be important to him in everything that he does. It requires good binocular coördination of the eyes, and so the squinter is off to a very poor start. He is often a poor athlete and socially he is, perhaps, an outcast because of his appearance. His teacher may fail to understand his plight and keep him in a seat where he cannot see the blackboard or chide him before the class for his slowness in reading or copying his work.

All of these impressions are deep and lasting in a child of this age, for it is at this time that he is very sensitive to the attitude of others. These are his formative years, and during this time he develops into a useful, well-adjusted citizen, or into a psychologic problem. He may develop a deep sense of his own inferiority. Although he may never say anything about it, he feels left out of things and is forced to take a defensive attitude to cope with the situation. He becomes either excessively shy and timid, or he goes to the other extreme and becomes overaggressive. His is the loudest voice in any argument. He bullies younger and smaller children, and is generally a problem both at school and at home.

It follows, therefore, that we not only have to deal with a squint, but sometimes a serious emotional problem as well. If he

has a very noticeable squint, cosmetic straightening of his eyes will produce a marked improvement in his emotional stabilitity. There is always a great change in the attitude of the patient, child or adult, when his eyes have been set cosmetically straight. He at least looks like everyone else, even though he may not have learned to use his eyes correctly. His school work improves and so does his general outlook on life.

If a child is very sensitive about his appearance, he is usually coöperative when he understands that the goal of all of his effort is straight eyes. This desire for straight eyes is sometimes very difficult to inspire in a young child. Usually the best method of obtaining coöperation is to ask him what he wants to be when he grows up, and, no matter what the answer, tell him that to achieve his wish is impossible unless he has straight eyes and uses them together.

Keeping the child interested

Keeping the young patient interested over a long period of training is a more difficult task. He may be enthusiastic at the start, but he is quickly bored if the goal toward which he is working is very distant. I think that praise for each task accomplished does more to uphold his interest than anything else. The future is very distant to a child of grade-school age. He lives for today, and praise for today's work means much more to him than glowing accounts of what he will be able to do in six months. He must be praised for each achievement. Any task given him must be within his ocular and mental capacity or he will be quickly discouraged.

Most children are anxious to please and some will agree to anything. It is soon possible to tell which child lacks the desire to improve to the extent that he is willing to make things easier for himself by giving untruthful answers. He must be made to understand that he is the one who must do all of the work, and that wrong answers are of no help.

Rewards of any kind are excellent for maintaining coöperation, if they are given only when they are deserved. If the patient does not put forth the effort expected of him, he should have no reward. Some technicians use report cards. At each visit the child receives a star which he is allowed to put on the card. It is gold if he has done excellent work, silver for good work, red, blue, green and so on, down to no star at all for poor attention. He is allowed to choose the star he thinks his application has merited and is usually honest enough to choose the right one. This seems to be an excellent method of maintaining the coöperation and enthusiasm of young children. They are very proud of any stars or report cards received in school, and if the squinter is not doing too well in his regular school work, the stars he receives for doing his exercises well are very welcome. I have a large screen, and each coöperative patient is allowed to draw a picture and hang it there. If he does not give the proper attention to his work, the picture goes home with him. Some technicians use candy as a reward. No matter what the reward, if a child is denied it for poor coöperation, he will usually try to improve at the next visit. Rewards are not absolutely necessary, but they are a great help with many children, when nothing else seems to inspire effort.

Inspite of everything we can do, there are times when a child will no longer coöperate, even though he has shown some improvement. He is too conscious of his eyes, and tired of exercises. The best thing for him is a vacation. Let him forget his eyes, and he will come back with a renewed desire to improve.

Attitude of parents

The attitude of the parents is most im-

portant in the treatment of a squinting child. Complete coöperation on the part of the parents or guardian is the first requisite for successful orthoptic training for children. If the parents understand what is wrong with their child, they are usually willing to do almost anything to help him. The ophthalmologist and orthoptist can explain, in terms which will be easily understood, the results of their tests and what they propose to do. The parents of a squinter must understand his difficulty and allow for his difference from his brothers and sisters. If they are to help their child, however, they must overcome the tendency to defer to all of his wishes to the extent of spoiling him. Mother can do a great deal in making Johnny understand that he must wear his patch. She can encourage him and make his home exercises a game instead of a dreaded task. The squinter who has a happy, well-adjusted home life, with wise and understanding parents, will achieve his goal in a much shorter time than the one who hears constant nagging about his exercises and criticism instead of praise at home.

The psychology of patching

The psychologic aspects of patching deserve special mention. Unfortunately, it is very often an absolute necessity in the treatment of squint. Here again, the desirability of treatment during the preschool years is evident. Occlusion seldom has an adverse psychologic effect on a two- or three-year-old child. Once he has become accustomed to wearing the patch, he forgets all about it. He must understand, however, that the patch must stay on at all times. Here the coöperation of the mother is most important. If she is firm at the start of the occlusion period, she will have no trouble, but if she lets the child remove his patch at various times, she will find that he is a problem.

When a child reaches school age, patching presents a more difficult problem. He may have difficulty in making friends, or fall behind in his work. He fails at many things and, if not handled properly, develops a genuine feeling of inferiority which produces a kind of paralysis of effort.

After the age of 11 or 12 years, a child may develop such a severe complex that the results of patching are not worth the psychologic havoc which may be wrought. At this age, too, the probability that occlusion will improve vision to any great extent is much more doubtful.

To make a success of occlusion, the patient must be sold on the idea, except in the case of a very young child. We must appeal to his pride, to his future ambitions, or to his vanity to make him understand the value of two good eyes.

We all have to cope with the problem of peeking over, under, or around the patch. Many children mean well, and make solemn promises not to peek, but do so anyhow. The most successful method of avoiding this would seem to be by having patches which exclude all light from the eye. If the vision of the amblyopic eye is so poor that his activities are greatly limited, it is almost impossible for a child not to try to use the occluded eye if it is at all possible. Any child who persists in peeking when he is wearing an Elastoplast patch, is not sold on the idea, and probably will not improve unless his attitude is changed.

Constant encouragement makes the period of occlusion easier for both patient and parents. Any improvement, no matter how small, is welcomed; and for this reason, it is well to check the vision of the patient frequently, especially when he first starts to wear his patch. It is well, too, to be able to show the parents that the occluded eye still has good vision, for they invariably worry about it. The child

thrives on praise for any tasks which he can accomplish well, and accepts extra help with those tasks causing difficulty. Praise, instead of criticism, will help him more than anything else.

As the patient grows older, chances of a marked improvement of the vision in his amblyopic eye decrease. This should be carefully explained to him, and he should be allowed to make the choice of whether or not to wear a patch. If he has a goal which requires equal vision in his two eyes—the Naval Academy, West Point, and so forth—he will try anything to regain his vision.

Summary

The success of orthoptic training depends on the desire and will of the patient to learn the skill of binocular single vision. The development of this will to succeed depends largely on the teaching ability of the orthoptist. She must present exercises in the way that will be most readily accomplished by each patient. She must analyze the problem of each patient and find out what can be done with a maximum of effort. Then the patient's desire for success must be stimulated. As soon as he has learned one skill, he should start immediately to learn the next. Above all, we must think of our patients as individuals, not cases. We must never forget the human element involved.

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NOTES, CASES, INSTRUMENTS

HEMORRHAGE IN SARCOMA OF THE CHOROID*

A CLINICAL PATHOLOGIC REPORT

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HISTORY

H. M., a 55-year-old white man, had noticed for the past two weeks an occasional "shadow" in front of his left eye which he thought might be caused by his heavy, bushy eyebrows. He often tried to brush it away but it recurred frequently. On the day before he was examined, he noticed a sudden loss of vision of the left eye. There was no preceding trauma and no associated pain, headache, nor inflammation of the eye. The right eye was normal in all respects with 20/20 vision. The left eye had vision limited to hand movements in the lower field. The globe was normal externally. The media were clear. The left fundus revealed a large, rounded, smooth detachment in the entire lower portion of the retina extending up to and beyond the macular area. The area of detachment was partly lobulated, and there was no transmission of light through the detached area on transillumination. Most of the detached area gave the impression that it was due to a hemorrhage but in the lowest portion there was some mottled pigmentation which Dr. Webster described as having the appearance of the "mottled coloring sometimes seen on a grapefruit." On the patient's admission to the Manhattan Eye, Ear, and Throat Hospital, it was found that his blood sugar content was 280 mg. percent and that the urine contained 5 percent of sugar. Under treatment for three days with insulin, the blood sugar content was brought down to 120 mg. percent, and the urine was sugar free. X-ray pictures of the chest, long bones, and spinal column were negative for metastases. When the eye was enucleated, there was profuse bleeding which persisted for one hour after which a gold ball was put into Tenon's capsule.

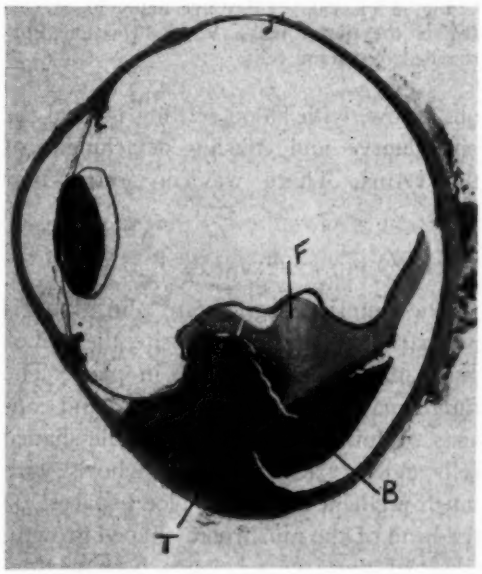

Fig. 1 (Laval). A cross section of the enucleated globe showing the mushroom-shaped tumor arising in the choroid and the large subretinal hemorrhage. T, tumor; B, blood; F, subretinal fluid.

PATHOLOGY

The globe was normal in its gross appearance. On section a large hemorrhage was seen occupying approximately one third of the vitreous area. No tumor was seen until several sections were prepared for staining when a mushroom-shaped mass was seen protruding into the vitre-

* From the laboratory of the Manhattan Eye, Ear, and Throat Hospital.

Fig. 2 (Laval). There are many blood vessels in the tumor mass. V, blood vessels surrounded by tumor cells.

ous below, with blood settling toward the optic nerve and causing detachment of the retina. There was no extraocular mass.

Microscopic appearance

The anterior segment of the globe is normal. On the side opposite the tumor mass, the retina is firmly in place. The tumor mass arises in the choroid and consists of mixed round and spindle-shaped cells, closely packed, some in whorls, with much pigment and many blood spaces. At the head of the mushroom-shaped growth, some of these vessels have been perforated by the tumor cells causing a profuse hemorrhage with further detachment of the retina. The detachment extends from the region of the ora serrata to the optic nerve. The choroidal vessels in the region of the tumor are quite engorged in contrast to the normal condition of the choroidal vessels on the side opposite the tumor. No emissaria are involved in the sections studied and the optic nerve is not invaded. A Wilder stain shows almost complete absence of reticular supporting fibers throughout the tumor mass.

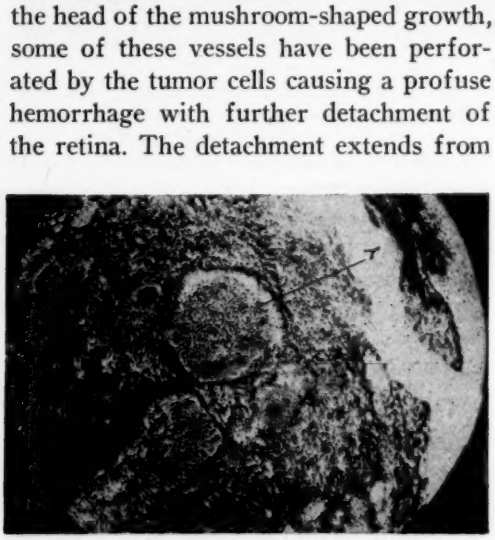

Fig. 3 (Laval). The tumor cells have eroded the dilated vessel walls causing a hemorrhage. T, tumor cells invading a blood vessel.

Comment

The differential diagnosis between sarcoma of the choroid and subretinal hemorrhage is often difficult. It is not unusual to see enucleated globes with a subretinal hemorrhage and no tumor, when the clinical diagnosis was choroidal tumor. The combination of both lesions, however, is quite rare and to make the correct diagnosis of tumor as responsible for the hemorrhage is extremely difficult. When a diagnosis of diabetes was established in the case herein reported, the inclination toward hemorrhage as against tumor must have been tempting, but it is to be remembered that diabetic hemorrhages are in the retina and vitreous and not subretinal.

Fig. 4 (Laval). The Wilder stain (a silver stain) shows hardly any connective-tissue fibers in the tumor mass. R, reticular fibers.

While the sarcoma was encroaching on the vitreous chamber, the patient noticed only a slight interference with his upper field as an occasional flitting shadow. When the neoplastic process eroded the choroidal vessels with resultant profuse subretinal hemorrhage and detachment of the retina up to and beyond the macula, the effect on vision was sudden and catastrophic.

The prolonged bleeding which ensued after enucleation is explained by the use of insulin for three days prior to surgery. This was responsible for a change in blood volume. One should be very careful about the intensive use of insulin in diabetes prior to surgery of any sort.

The Wilder stain of the sections demonstrates the paucity of connective tissue supporting fibers, which is indicative of a very high level of malignancy with propensity for metastases. The tumor cells were of the mixed type, some being spindle-shaped and arranged around vessels and others rounded or epitheloid in nature. The spindle-shaped cells are less malignant in nature than the epithelioid cells. The amount of pigment scattered in the tumor was not profuse but this is of no significance as to degree of malignancy. The pigment is manufactured by the tumor cells themselves and is an indication of their reversal to their embryonic nature.

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A COMBINATION RED FILTER AND OCCLUDER*

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Hempstead, New York

This instrument consisting of a ground-plastic red filter blackened on one end with a handle in the middle was originally designed to simplify the technique of the parallax test.

For this test the red filter is placed over one eye, for example, the left eye with the opaque portion over the right eye. If a small, commercial green light at 20 feet is used for fixation, the patient sees only a red light. If the red portion is then moved off to the side, placing the opaque portion over the left eye and uncovering the right eye, the patient will then see only a green light. If the instrument is then moved back and forth between these two positions fairly rapidly, the patient will see alternately a red and a green light with the left and the right eyes successively. If the red light is higher than the green, a right hyperphoria is indicated. The proper neutralizing prism base down before the right eye measures the amount of hyperphoria. The horizontal balance is similarly measured. Only one hand is needed to make the complete change, leaving the other hand free to manipulate prisms.

The instrument measures 3.5 cm. by 9 cm. with a handle placed at right angles to one side. The black portion of the instrument may be used as an occluder for taking vision or performing the alternate cover test. Gross fusion may also be checked by placing the red filter over one eye, leaving the other eye uncovered, and then alternately covering and uncovering one eye with the red filter. If the patient sees a mixed red and green alternating with a plain green light, fusion is taking place. If separate red and green lights are seen when the red filter is in place over one eye, diplopia is present and it is possible to analyze the diplopia.

This instrument combines in simple form a red filter and occluder with which one can perform several tests and gain considerable information in a short time.

131 Fulton Avenue.

* Made for me by Clairmont and Nichols, 517 Madison Avenue, New York.

A STUDY OF TUBULAR AND SPIRAL CENTRAL FIELDS IN HYSTERIA*

THOMAS H. EAMES, M.D.
Belmont, Massachusetts

Concentrically contracted (or tubular) visual fields are variously regarded as symptomatic of hysteria. Ford,[1] May,[2] and Tassman[3] have listed such fields as at least suggestive of hysteria. Yasuna[4] presented 15 cases of hysterical amblyopia, 14 of which exhibited tubular fields, and Halpern[5] reported 15 cases of hysterical amblyopia in which the field tracings were usually tubular. May suggested that the spiral field might be included here. In such cases, progressive contraction is noted *during* examination. Berens and Zuckerman[6] listed spiral fields as being due to fatigue or functional causes, while Peter[7] and Traquair[8] were of the opinion that spiral fields occur in neurasthenia rather than in hysteria. Discussion with medical and psychologic colleagues mirrored this variation in opinion. The present study was undertaken to contribute further data to the subject.

The normal central field[9] as tested on a tangent screen at 750 mm. with a 1-mm., white test object extends nasally 26 degrees; temporally, 33 degrees; superiorly, 26 degrees; and inferiorly, 28 degrees. Tubular fields are concentrically contracted with the same isopter distance in all meridians. Their extent is variously estimated up to about 25 degrees. The criterion used in this study was concentric contraction to 15 degrees or less from the fixation point as determined with the tangent screen under the conditions described in the opening sentence of this paragraph.

Of the 193 unselected school children examined, 9 percent exhibited tubular central fields. The median age of these pupils was 9 years, 11 months. The median extent of their tubular fields was 9 degrees, with Q_1, 7 degrees, and Q_3, 10 degrees. The tubular field chartings exhibited no marked variation with changes in the test distance as normal fields tend to do. One child presented a spiral field but displayed no other evidence of hysteria or neurasthenia.

Forty-four percent of the cases with tubular central fields exhibited amblyopia sufficient to reduce visual acuity to 20/30 or less; while 11 percent showed amblyopia with visual acuity of 20/150 or less. Eighty-three percent of the tubular, central-field cases were failing in their school work in one or more subjects. Hysteria was suspected in 77 percent of the cases, and a positive diagnosis of hysteria was made in 33 percent; a provisional diagnosis, in 44 percent. Twenty-three percent of the cases exhibited no other symptom or sign of hysteria.

One of the cases presented a confused picture. This patient was failing in school, exhibited signs of hysteria, including a moderate amblyopia and tubular central fields, but he also had a concurrent illness which might have caused either or both visual impairment and central-field restriction. Unlike the others this patient's field returned to normal very slowly over a period of 14 months, during which time he received remedial teaching as well as therapy for his concurrent illness. It is impossible to determine which condition was responsible for the tubular central fields in this particular case.

Forty-four percent of the tubular central-field cases were rechecked at various intervals averaging 12 months in length. All exhibited central fields of normal size and shape when rechecked except for the single case with concurrent disease.

This study supports the contentions

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that: (1) tubular central fields occur frequently but not necessarily always in cases of hysteria; and (2) tubular central fields and amblyopia together are frequent but not invariable manifestations of that condition. It is my opinion that both these manifestations when taken together are a more reliable indication of possible hysteria than either one taken alone, since there are diseases which can influence either central fields or visual acuity in such a way as to confuse the picture beyond reliable interpretation. Therefore, when visual acuity measurements and central-field chartings are used in examinations for hysteria, a diagnosis should not be made on the mere presence of either or both of these conditions, although the demonstration of either or both should suggest the possibility of the presence of hysteria.

560 Pleasant Street.

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A FIXATION LIGHT FOR THE CARDINAL DIRECTIONS OF GAZE*

William Councilman Owens, M.D.
Baltimore, Maryland

The deviations of the eyes in the six cardinal directions of gaze should always be measured in the routine study of ocular motor anomalies. To make these measurements quickly and accurately, certain important factors should be controlled and standardized. The measurements should be made with the head erect to eliminate changes in the tone of the ocular muscles induced by turning and tilting the head on the neck.[1] In addition, the measurements should be made with the eyes at constant, standard angles of rotation from the primary position. Only by such standardization are the measurements reproducible, or comparable with measurements made on different patients or on the same patient at different times. The best method of making these measurements is by the use of the prism cover test while the patient fixates a light, for this method reveals most about the ocular muscles. In measuring the deviation by this method, the observer is constantly watching the action of the muscles as the eye moves to take up fixation. White[2] stated that the prism cover test "makes for much keener power of observation, and for an intimacy with the functions of the ocular muscles which cannot be acquired by any other test."

Although many instruments[3] have been devised to facilitate measuring the deviation in the six cardinal directions, the use

* From the Wilmer Ophthalmological Institute of the Johns Hopkins Hospital and University.

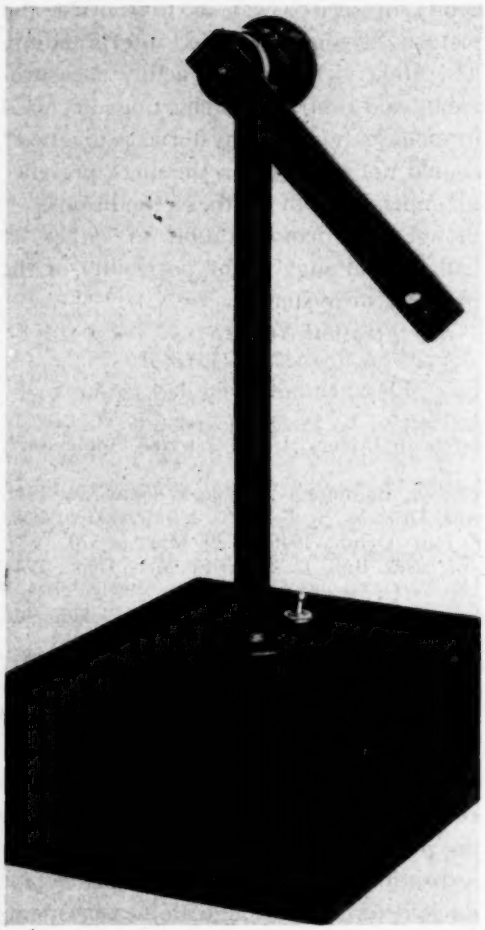

Fig. 1 (Owens). Fixation light for the cardinal directions of gaze.

of the prism cover test with the patient fixating a light remains the method of choice. A simple fixation light for the cardinal directions of gaze has been constructed.† It provides a method of placing a fixation light in standard positions of gaze in the six cardinal directions. A similar method of fixation was used by Friedenwald[4] in measuring anisophoria with a phorometer. The instrument (fig. 1) consists of a base with an upright bar, 33 cm. high, to which is attached a rotating arm, 19 cm. long. The arm rotates around the upright bar and is provided with automatic stops that place the arm in the six cardinal meridians of gaze. Two bulbs on the rotating arm are used for fixation. One is placed at the center of rotation of the arm. It remains stationary when the arm is turned and is used for fixation in the primary position at 33 cm. The other bulb on the rotating arm is placed 15.4 cm. from the center of rotation. It moves into the six cardinal positions of gaze as the rotating arm is turned into the six standard meridians. When the patient's eyes fixate the peripheral light, their constant angle of rotation from the primary position of gaze is 25 degrees in each of the six cardinal directions.

The instrument is used on a table with an adjustable head and chin rest (fig. 2). The central light is placed directly in front of the patient at a distance of 33 cm. First the peripheral light is turned off, and the patient fixates the central light while the deviation of the eyes in the primary position for near is measured by the prism and cover test. Next the central light is turned off, the peripheral light illuminated, and the arm placed successively in each of the six cardinal meridians. While the patient fixates the peripheral light, measurements of the horizontal and vertical deviations are made by the

Fig. 2 (Owens). Fixation light for the cardinal directions of gaze being used with the prism cover test.

† Built by Mr. Albert Goebel in the machine shop of the Wilmer Ophthalmological Institute.

prism and cover test in each of the six cardinal directions of gaze. The light is easily shifted from one position of gaze to the next by simply rotating the arm until it comes to the next automatic stop.

This instrument is extremely useful for it standardizes the position of gaze in the six cardinal directions. With it, measurements can be made more quickly and accurately, for the operator's hands are free, and there is adequate, unencumbered working space. The action of the eyes can be easily visualized by using the prism cover test, and the corneal reflex of the uncovered eye can be watched constantly. The instrument is simple and can be used readily with both adults and children. It is particularly helpful with children, for the head is held in a constant position and the child enjoys watching the fixation light swing into the cardinal positions of gaze as the arm is rotated into the six meridians.

Johns Hopkins Hospital (5).

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PATHOGENESIS OF FUNDUS CHANGES IN SKULL INJURIES*

Z. Kaminskaya-Pavlova, M.D.
Moscow

Skull injuries, as is known, are frequently associated with fundus changes. The pathogenesis of these changes is not always clear, especially if the fundus changes develop some time subsequent to the trauma, and there are no signs in the central nervous system (abscess, meningitis) to account for the fundus changes. Such circumstances always complicate the management of the case. Usually in such cases therapy is symptomatic, not etiologic which makes it less effective.

We would like in this brief presentation to call attention to one factor which sometimes plays a dominant role in the development of various posttraumatic changes. This factor may be the background against which the posttraumatic picture develops.

On one hand, trauma may serve as the stimulus which awakens within the organism a latent pathologic process; on the other hand it weakens the organism and lowers its resistance so that a hidden pathologic process becomes virulent. For instance, numerous cases of luetic parenchymatous keratitis, which set in following an injury, have been reported in the literature. It is also known that in cases of tuberculous allergy, the traumatic

* From the third Moscow Medical Institute.

site fixes the bacterial metastasis. This was demonstrated through numerous experiments for various organs, including the eye (Rappoport, Kaminski).

Clinical observation also demonstrates that trauma not infrequently leads to the development of tuberculosis in the traumatized organ. For instance, cases of a perforating ocular injury followed by a tubercular process, and diagnosed histopathologically, have been reported.

All this testifies to the important role of the background against which the traumatic process develops. The importance of the premorbid state is so great that not to recognize its importance in the analysis of the pathogenetic factors would be a grave error.

Case reports

Several cases under our care serve as vivid illustrations of this situation, and we therefore report them briefly.

Case 1. A man, 40 years of age, was seen because of rapidly diminishing vision. This condition developed after a comparatively mild bump of the forehead against an iron rod. The patient did not lose consciousness, but was dizzy for some time. Immediately after the injury, he noticed rapid diminution of vision. One month later at the time of examination, vision was: 0.03 and 0.04. The fundus revealed a descending atrophy of the optic nerve. A careful neuropathologic examination made one suspect lues. An analysis of the cerebrospinal fluid, as well as the subsequent clinical course, confirmed the diagnosis.

In this case, it would seem that the injury served as the stimulus for the development of a process, which might have developed anyway. Trauma, however, hastened development of the disease and made the prognosis unfavorable. The patient rapidly became blind.

Case 2. Even more interesting is this case of moderately pronounced oxycephaly. The fact that the man was a sniper justifies the assumption that his vision was good. During a battle he suffered a contusion. Following the injury he began to suffer persistent pain in the head, and vision began to fail. Examination revealed a secondary optic atrophy. Visual acuity was 0.01 in each eye. There is the possibility that the optic atrophy preceded the injury, because it is frequent in oxycephaly. However, a record of good visual acuity prior to the injury indicates that, even if the patient did have an optic atrophy, it did not affect his vision. The injury, having fallen on fertile soil, resulted in the rapid development of a process which ended in almost total blindness.

For purposes of observation the patient was placed in the neurologic clinic, where it was found that he had arachnoiditis with raised intracranial pressure. In the opinion of the neuropathologist, the raised intracranial pressure was undoubtedly related to the oxycephaly. The literature contains the description of a similar case (Birm) in which, after an injury, a man with oxycephaly suffered rapid deterioration of vision. He had an optic atrophy.

Case 3. This case is unique. A woman with Raynaud's disease suffered a skull injury in an automobile wreck. Following the injury, she developed a cerebral form of Raynaud's disease with attacks of acute cerebral anemia. During these attacks, we could observe sharply pronounced arterial spasms in her fundus. Thus, the trauma served to transfer the site of the disease from the extremities to the central nervous system.

Case 4. This case deals with a skull injury in a hypertensive patient. A woman, 45-years-old, with vascular hypertension

fell and injured her head. There was a brief loss of consciousness, with dizziness and headache.

At the first examination it was found that she had peripapillary edema. Her general condition became aggravated; she began to have attacks of unconsciousness and was hospitalized. Her blood pressure was high (170/105 mm. Hg.) After two months of hospitalization, she was discharged in a satisfactory condition. The attacks recurred and soon she developed markedly choked discs. She was again hospitalized. Repeated lumbar punctures led to considerable improvement; the choked discs disappeared, leaving slight edema. Soon after discharge from the hospital, symptoms again recurred, and vision, which until then was normal began to fail.

The neuropathologist explained the case in the following manner: "An insignificant trauma gave rise to serious complications and an unfavorable course, only because the patient had hypertension. Hypertension in this case formed the background which determined the character of the clinical course of the disease, giving it a grave form, not associated with light trauma."

Case 5. A man, aged 30 years, developed a descending optic atrophy with vision reduced to 0.3 following a skull injury during a bombardment. The trauma was light; there was no loss of consciousness; the visual loss was gradual, beginning with a central scotoma which gradually disappeared. The history revealed that this was the third skull injury sustained by this patient. The first was during infancy when he fell from the roof of a barn. The last two injuries were sustained within 1½ years during the war. The last injury resulted in more severe complications than the other two. In addition to optic atrophy, it caused neurologic symptoms such as headache, dizziness, paresthesia, and so forth. The case was regarded as a traumatic arachnoiditis caused by repeated injuries.

Discussion

These five cases, with the common etiology of injury to the skull and different backgrounds against which posttraumatic symptoms developed, demonstrate the importance of a careful study of injuries.

Among posttraumatic changes, optic atrophy is a frequently encountered phenomenon, and yet, it is frequently difficult to understand why an optic atrophy should develop following an injury, particularly if it was slight. The pathogenesis of optic atrophy is clear in cases in which there is bone injury, and in those in which a fracture of the optic canal is suspected. Sometimes the cause of the optic atrophy is a hemorrhage into the meninges of the optic nerve. Complications such as meningo-encephalitis or abscess of the brain may also lead to optic atrophy.

Along with these more familiar cases, we encounter cases which we do not understand. In such cases it is important to get a detailed history and make a careful examination. Congenital anomalies, previous illness or trauma, the presence of latent pathologic processes (lues, malaria, tuberculosis, hypertension, septic foci, and so forth) may serve as fertile soil for the development of posttraumatic complications. Not only may these conditions initiate development of the disease, but they may also aggravate its clinical course. Demonstration of these factors facilitates understanding of the processes involved and helps in the application of rational therapy.

4th Sokolnicheskaya Street (11).

SOCIETY PROCEEDINGS

Edited by DONALD J. LYLE, M.D.

NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY

May 6, 1946

DR. MAURICE L. WIESELTHIER, *presiding*

DANGER OF PENICILLIN IN ACTIVE UVEITIS

DR. ELTON YASUNA said that, after intramuscular injection, only low levels of penicillin are found in the aqueous, even with massive doses. The most satisfactory aqueous concentration is obtained by topical administration, using penicillin-saturated cotton packs in the lower fornix. In severe infections, injections, both subconjunctival and directly into the aqueous, have been employed, but these cause irritation.

Penicillin has been found to be effective in the treatment of the purulent infections of the external eye. However, in uveitis most reports show that penicillin is not effective.

Two case histories were presented. Both patients had uveitis, possibly Neisserian in etiology. In each instance, the uveitis was subsiding under the usual therapy when intramuscular penicillin was begun for the chronic urethritis. The uveitis became worse, and the penicillin treatments were stopped, following which the eyes rapidly became quiet.

A possible explanation for this exacerbation was proposed. The inflammatory process in uveitis is probably not a result of direct bacterial invasion, but rather due to tissue sensitivity from bacterial end products. Also, it has been shown that the action of penicillin is bactericidal. Therefore, penicillin administered systemically causes destruction of bacteria in the focus of infection. This liberates more bacterial end products into the blood stream, which further aggravates the active uveitis.

It was suggested that penicillin should not be used in active uveitis because its therapeutic value is doubtful, and because it may actually be dangerous.

PLASTIC SURGERY OF THE EYELIDS

DR. WENDELL L. HUGHES places emphasis on the division of the lid into two layers, surgically, cosmetically, and functionally. When less than one fourth of the upper lid is missing, the remaining portion of the lid can frequently be pulled together and joined with a tongue and groove joint, supported by a flap of skin just back of the lid margin. When one fourth to one half of the lid is missing at either the nasal or temporal sides, the remaining portion of the lid can usually be divided into two layers and one layer slid across into the defect. It is usually better to slide the tarsoconjunctival layer across into the defect and then put a skin graft over this area. The tarsoconjunctiva is left attached to the levator.

When the upper lid is entirely missing, a major procedure with several steps is necessary. First, the conjunctiva must be brought across the cornea to protect it. The conjunctival surface is kept in contact with the corneal surface. Skin is then slid from nearby areas to give a double layer over the eye with which to start. Additional skin must usually be provided. Tarsoconjunctiva as a free graft can be taken from the opposite upper lid, if it is normal. Skin is taken from the opposite upper lid, and lashes for the upper lid are taken from the brow on the

same side. An almost complete blepharorrhaphy is maintained for the duration of the several stages in the reconstruction of the upper lid. It usually takes more than a year to complete the reconstruction. If the levator has been severed, it may need to be reattached to the newly constructed upper lid. A tarsorrhaphy or blepharorraphy is almost always necessary in reconstructing any major portion of the upper lid.

USE OF FREE-SKIN GRAFTS

DR. J. EASTMAN SHEEHAN illustrated his new method of dealing with free-skin grafts, explaining that, although in the beginning there was a 50 percent loss, now there is practically none. The advance was illustrated by a case in which, under his method, sutures are not necessary. Circulation is reëstablished so rapidly that overlapping edges, if allowed, bleed when cut on the second day. Definite recovery is achieved on the 14th day, and in two months the graft cannot be distinguished from its surroundings.

What is new about the method is the addition of certain blood elements. At the time of operation the patient himself supplies blood drawn by an aspiration needle. It runs to 10 cc. capacity. To maintain fluidity, 1 mg. of heparin and 1 cc. of Tyrode's solution are added. This overcomes the tendency of a graft to shrink. The graft, made fast to gauze, is transferred to the wound area, which it precisely fills. A margin of the gauze holds it in place.

The graft is held firmly in place by an extract from the blood. After the blood has been centrifuged for 20 minutes, there is clear plasma at the top, a thin film of white cells, and the red corpuscles. These last do not enter, but the other two do. The recipient area is painted with the plasma. The under side of the graft is also painted, a different color.

With the rubberized fabric held up by an assistant, the operator guides the graft to its place. Fixation is complete. The particles from the blood hold the graft in place.

The process of recovery is interesting to watch. The graft takes on a purplish tinge after five hours, gives signs of life after 10 hours, is a full purple on the third day, a definite pink on the 14th day.

Discussion. Dr. Raymond E. Meek described the operation he has devised for the correction of entropion. He stated that the circular fibers of the orbicularis oculi have two directions and functions. The circular fibers which run around the eye elevate the lower eyelid by contracting and flattening the arc, while at the margin of the lower lid they curve in the horizontal plane pulling and holding the lid against eyeball. He changes the direction of these fibers, which cause the spastic entropion, and corrects the condition by making a horizontal incision the full length of the lid and 3 mm. from the margin. The skin is undermined and two tongues of the exposed orbicularis are dissected so that they remain attached at the center of the eyelid. Incisions from below the center are made downward and laterally to the orbital margin and with catgut, tongues of orbicularis are sutured to the periosteum without any tension. The skin is closed with interrupted silk sutures.

Dr. Clarence R. Straatsma said that plasma glue was used for a time at the Brooklyn Naval Hospital. While the results were favorable, its use was ultimately discontinued because the frequent change in personnel made it necessary to train new help repeatedly. It was found that the procedure was more uniform and stable when more thrombin was used.

Dr. Sidney A. Fox said that he was happy to hear Dr. Hughes say that it is rare to achieve results equal to the normal

condition. He agreed with Dr. Hughes's use of tarsal cartilage to replace tarsal cartilage and said that he always tries to replace tissue with the same tissue although there are usually several methods of correcting any particular condition.

Slides illustrating several cases were shown. In several of these preserved cartilage was buried under the skin and after a few weeks the skin and the now adherent cartilage swung into position on a pedicle to the skin-tarsal layer of the new eyelid.

Leon H. Ehrlich,
Secretary.

LOS ANGELES SOCIETY FOR OPHTHALMOLOGY AND OTOLARYNGOLOGY

Section on Ophthalmology

May 27, 1946

Dr. George P. Landegger, *presiding*

An improved procedure in prosthesis plastic surgery

Dr. S. V. Abraham presented a preliminary report on a new technique for evisceration with sparing of the cornea and scleral implantation. He pointed out that the only similar technique for evisceration with saving of the cornea was brought out by Burch in 1939.

In Burch's technique, the conjunctiva is dissected free of the limbus for four fifths of the limbus. The sclera is exposed for an area about 5 to 6 mm. from the limbus. The sclera is then incised about 5 to 6 mm. from the limbus, and the incision enlarged, running more or less parallel to the limbus and through four fifths of the circumference of the globe. The evisceration is then completed, including scraping of the posterior surface of the cornea. An implant is inserted and the scleral wound is closed. The conjunctiva is sewed to the limbus area. Dr. Abraham pointed out that Burch's technique leaves the scleral wound anterior and in close contact to the conjunctival wound. The opening, he said, encircles the globe for four fifths of its circumference.

Dr. Abraham described his technique as follows: A conjunctival incision running parallel to the limbus is made temporally about 7 to 8 mm. from the limbus. The incision runs approximately from the superior rectus downward for about ¾ to 1 inch. The sclera, he stated, is exposed anterior and posterior to the conjunctival incision, the conjunctiva being retracted. The external rectus muscle is identified. The sclera is incised parallel to the upper rim of the external rectus muscle and 2 to 3 mm. above the same. The incision is carried backward and forward as far as desired to permit not only easy access to the ocular contents, but also the implantation of a large ball. The anterior end of the scleral incision should be at least 2 mm. from the limbus. He went on to say that after removing the ocular contents (and scraping the posterior corneal surface if desired), the implant is placed within the sclera, using as large an implant as possible (18 to 22 mm.), and the scleral wound is closed with interrupted mattress sutures. The conjunctiva may be closed with a running suture.

This technique permits scleral implants of larger size, with minimum danger of extrusion. The deep incision contacts the superficial incision in only one point. Dr. Abraham said that the incision runs in the direction of the major pressure from within the globe and the orbit, so minimizing the possibility of extrusion. He pointed out that the final result is a larger stump, with greater retention of the normal conjunctival tissue and folds,

thus making for better cosmetic results.

He also emphasized that better results occur with the preservation of a maximum stump, the maximum retention of a normal conjunctival sac, and the use of a minimum sized artificial eye. Saving of the cornea is essential for the retention of a maximum conjunctival sac.

Discussion. Dr. G. Zugsmith reviewed his observations of more than 1,000 cases in the army. These cases, he said, had had enucleation without implantation, enucleation with implantation, evisceration without scleral implant, and evisceration with scleral implant. Some of his cases had been operated as long as 25 years before observation, and some cases were done only a short time before observation. Dr. Zugsmith observed that surgery had similar pathologic results in all the cases; that is, there was a shrinkage of the orbital tissue with a contraction or atrophy of the conjunctiva, and a tendency of the orbital contents to sink to the floor of the orbit. Dr. Zugsmith found that these pathologic changes were least in cases of evisceration with scleral implant, and most with enucleation without implantation. He found that the cosmetic results were, therefore, best with evisceration and scleral implant. He reported that his experiences did not include scleral implant with saving of the cornea.

C. H. Albaugh,
Reporter.

SOCIEDAD OFTALMOLOGICA DE MADRID

May 31, 1946

Bilateral glioma of retina

Dr. Mario Esteban presented a case of bilateral glioma of the retina. A boy aged two years, whose right eye has already been removed for glioma of the retina, now shows in his left eye the existence of a tumor of like malignancy. You are all familiar with the prognosis as to life of such a condition. The case is as interesting from the clinical standpoint as it is touching from the human standpoint because of the dilemna as to whether to enucleate the scond eye.

What else can be considered except enucleation? For the past few years radiotherapy has been tried and conscientiously followed. In the beginning, the tumor showed evident regression from the effect of the radiation, but now it seems to be moving again toward the papilla. Should we persist? Should we continue with such treatment? Or should we decide on an operation?

The results of the roentgen therapy in glioma of the retina are not conclusive. There are those who claim that X-ray treatments can cure a glioma and preserve the eye. Others maintain that every glioma will end fatally as regards the eye and life itself if enucleation is not done in time. They advise treatment with X rays—not to avoid an operation, but as a complement to it—before an operation in order to prevent metastasis and afterward to prevent recurrences, or both before and after for the double purpose indicated.

Radiotherapy is a valuable device which should be considered in tumors of this kind. We can and we should try it first in all such cases, but we cannot and should not trust in it exclusively. We have to observe the effects, watch developments, and be prepared to enucleate if necessary before extensions and metastasis develop. We must keep in mind that blindness cannot be avoided by not operating because the glioma itself destroys the eye. The operation at least will save the child's life.

In case of such a tumor in both eyes, which occurs unfortunately all too frequently, we ought to at first apply radio-

therapy. But if this fails in one eye or the other we must enucleate both eyes. It is our duty to do so, cruel and painful as the process may seem. There are no scientific, ethical, or social reasons to allow the child to die. On the other hand, blindness is not a renunciation of life; it is perhaps a more subjective and a more intense life, and the blind are not more unfortunate or less useful to society than the majority of those who see.

Glioma of the retina not only constitutes a very important clinical problem, but also a social problem. It has been proved that some adults, who were afflicted in infancy with glioma of the retina and whose eyes as a result were enucleated, bear children who also suffer from the same affliction, which shows that glioma is hereditary. Enucleation and the subsequent application of X rays are definitely indicated, and there is nothing else to do.

Discussion. Dr. Garcia Mansilla said that the case of double glioma of the retina which Dr. Mario Esteban presented to us is very interesting from a medical and moral aspect. From the first aspect, I believe that Dr. Esteban would act very well in enucleating the eye and then applying radiotherapy to the orbit in order to avoid the recurrence of the neoplasm. I believe that having the glioma already manifest in the other retina it is likewise necessary to do another enucleation, preceded and followed by radiation. In this way, it is possible to avoid the recurrence and metastasis of the neoplasm in distant organs. From the moral aspect, it is truly painful to enucleate the single eye which the boy has, although vision is rather poor. However, considering that whatever vision he has will shortly be lost and that the operation is the only way of saving life, I believe it is proper to convince the father of the patient that he should authorize the operation, because he certainly would prefer that his child should live even though blind. Moreover, we must also remember that when sight is lost early in life the individual adapts himself to his new condition easily and such blind individuals are as happy as many seeing ones. Bearing out this point, I know a man, aged 56 years, who as a child suffered double choriocyclitis, as a result of which he became completely blind, did not even see the slightest ray of light. I took care of him some 50 years ago. He now lives happy and contented. He is a masseur in an important establishment in Madrid and has many high-class, private patients and earns a good livelihood.

Dr. Carreras said that he entirely agreed with Dr. Mario Esteban in the manner in which he is handling this case of bilateral glioma. The enucleation of the second eye is important in order to save or try to save the life of the child. This is the first duty of the doctor even though it shows the failure of the ophthalmologist. The sacrifice of the other eye is most difficult for the parents. The child at this young age can receive an education which will enable him not only to be happy but also to be useful to his country. There have been many blind men who have become outstanding.

Dr. Galindez Rivero congratulated Dr. Mario Esteban for the presentation of his interesting case and for the conscientious examination which he had made. Truly the problem which presents itself to a child with glioma is very serious. Moreover the loss of sight becomes secondary to the peril of losing the child's life if appropriate measures are not rapidly instituted.

First of all, X-ray treatments should be tried, as Dr. Mario Esteban has well said, and the child should be watched so as to proceed immediately to enucleation, if necessary. Radiotherapy treatment ap-

pears to be always of some benefit. When the diagnosis is made early, good results can be obtained (Axenfeld). When the condition is already far advanced, it will prevent metastasis and provide better results after enucleation. The parents should be advised that glioma is congenital and that periodic examination of the eyes of the other children must be made in order to apply very early radiotherapy, if necessary. If the radiotherapy does not show any favorable results, enucleation of one eye or of both must be resorted to. If, as in this case, glioma is bilateral it certainly is terrible to tell the parents that enucleation is obligatory, but it is necessary to save the child's life. I am in complete agreement with Dr. Mario Esteban that there are no scientific, ethical, or social reasons for allowing the child to die. He may grow up to be a useful citizen and lead a happy and contented life.

ECTASIAS OF LACRIMAL SAC

DR. MARIN AMAT AND DR. MARIN ENCISO discussed the treatment of ectasias of the lacrimal sac by resection of the anterior wall, with presentation of patients. The immediate results are excellent. The operative technique is as follows:

1. Local anesthesia with 2-percent novocain in the same way as for dacryocystorhinostomy.

2. Curvilinear incision of the skin and superficial aponeurosis, identical with that which is in practice for dacryocystorhinostomy.

3. Separating with a blunt instrument the muscular fibers which cover the ectasia so as to expose the tendon of the orbicularis muscle and the anterior face of the lacrimal sac, so that it is freed from the surrounding tissues.

4. Sparing the tendon of the orbicularis, a portion of the anterior face of the sac is resected as much as is considered necessary by means of two slightly curvilinear anteroposterior incisions (the patient being in the horizontal position), by means of which the cavity of the sac is opened and its contents evacuated.

5. Introducing through the cavity into the nasal duct, whether this is open or not, a thick lacrimal, olive-tipped probe (no. 5 or 6) in order to enlarge the duct, if it is open; or to perforate it, if it is obstructed.

6. Suturing the lips over the resected part of the anterior wall of the sac with silk. The sutures should be somewhat thick and resistant in order that they can be easily removed. We use a continuous suture leaving the ends a little long in order to pass the upper thread under the lower border of the tendon of the orbicularis and take it out through the skin about 1 cm. from the wound, and we tie it to a rosary bead. We then tighten the silk suture and take it also through the skin about 1 cm. from the wound and tie it in the same way to another rosary bead. In this way, drawing on the silk sutures raises the anterior wall of the sac.

7. Suturing the skin by interrupted sutures.

8. If there is no communication between the inferior lacrimal canaliculus and the lacrimal sac, we reëstablish it.

9. The lacrimal sac is washed with sterile water in order to clean out the small amount of blood that might stay there and to make sure that the passages are all clear. Generally we do this step as soon as we have made the deep suture and with the cutaneous wound still open so that we are in a position to introduce modifications which may be necessary.

10. Place a sterile piece of gauze on the operated region, and fasten it with a strip of adhesive.

Discussion. Dr. Carreras said that he wished to congratulate the authors of this interesting communication on this procedure if it gives such good results as ap-

pears from the small number of cases treated by them. This will solve a problem for which the only satisfactory solution so far has been dacryocystorhinostomy, which is a much more formidable procedure, and the results of which are less natural. However, we have to wait some time before accepting the new method, because, more than for the immediate results, we must watch for the final and permanent results. It is well known that probings will solve for a time the problem of epiphora, but that later the condition returns slowly and progressively, and the passages which were forcibly opened by probing close again. I, myself, had occasion to attend patients in the beginning of my professional career in Gerona, who had been treated by probings by my late father and who were dismissed as cured because the epiphora had ceased; yet that did not prevent the epiphora from recurring after a variable time. It is, therefore, desirable that the successes obtained by Drs. Marin Amat and Marin Enciso be confirmed by a large experience to which I expect to contribute with the cases which I have.

Dr. Galindez Rivero congratulated Drs. Marin Amat and Marin Enciso on their interesting presentation. He said the method is original, is simple, traumatizes little, and, in the cases for which it is indicated, provides ideal treatment for this affection of the lacrimal passages. That is, it cures the ectasia of the lacrimal sac and restores the normal course of the tears, eliminating epiphora—a condition which is a nightmare to both patient and doctor—and does it in a manner which is simple, gentle, and accessible to everybody.

I promise to apply the procedure of Drs. Marin Amat and Marin Enciso in suitable cases and report on the results obtained.

Joseph I. Pascal,
Translator.

COLLEGE OF PHYSICIANS OF PHILADELPHIA

Section on Ophthalmology

April 18, 1946

Dr. Burton Chance, *chairman*

A case of Stevens-Johnson disease

Dr. Bruce A. Grove and Dr. Edmund Meisenhelder (by invitation) said that Stevens-Johnson disease is generally considered to be a manifestation of erythema exudativum multiforme first described as a clinical entity by Von Hebra in 1866. The lesions occur in the conjunctiva as well as on the mucous membranes of the mouth, nose, pharynx, larynx, trachea, bronchus, and genitalia. Conjunctivitis may be the first symptom of the general disease, and according to Duke-Elder may take three forms: namely, a relatively mild catarrhal, a purulent, or a severe pseudomembranous affection.

The first recorded case of ocular involvement was described by Fuchs in 1876 as "herpes iris conjunctivae." From cultures reported, staphylococcus aureus is more commonly found than any other organism. The disease is of sudden onset with high fever and marked constitutional symptoms which gradually subside. The patient usually recovers in about 18 to 21 days. Although the prostration is severe, the mortality rate is low, only four deaths having been reported.

A review of the literature illustrates the confusion existing among writers as to proper cataloging of the disease.

Case Report. A white man, aged 30 years, first complained of light hurting his eyes. Examination revealed mild injection of the palpebral and bulbar conjunctiva. Within 24 hours he was violently ill, and his temperature rose to 103.2° F. There was a skin rash consisting of macules, papules, and intracutaneous

vesicles. Involvement of all the mucous membranes and mucocutaneous junctions and severe pseudomembranous conjunctivitis were noted.

The patient was discharged on the 21st day following onset of the disease with no loss of visual acuity, slight symblepharon, marked scarring of the palpebral conjunctiva, and occlusion of all the puncta. Drug and serum reaction was ruled out as causative agents. Acute vitamin deficiency was suggested as a causative factor. The writers concluded that Stevens-Johnson disease is a severe form of erythema exudativum multiforme with involvement of the conjunctiva whether it be catarrhal, purulent, or pseudomembranous.

Discussion. Dr. John F. Wilson said that Stevens-Johnson disease is considered by many authorities to be erythema multiforme, and the slides which Dr. Grove showed very well demonstrate the extensiveness of involvement which may occur in this disease. Not only bullae were present, but there were in addition various other lesions on the skin; namely, macules, papules, and pustules. The disease, erythema multiforme, produces multiforme lesions, which involve any of the dermal areas or the mucous membranes. It is thought to be due to a virus, although the virus has never been demonstrated. It is possible in Dr. Grove's case that a dietary deficiency lowered the patient's resistance so that such a virus gained a foothold in the patient.

It is important to differentiate the changes in the eyes in this case from those occurring in pemphigus vulgaris. There are three outstanding characteristics seen in this patient which will differentiate his disease from the changes seen in pemphigus vulgaris. These are not directly relative to the ocular structures. First, as Dr. Grove mentioned, pemphigus is usually found in older patients. This patient is now 30 years of age. He was about 28-years old at the time of the attack. Second, the onset of the disease, unlike pemphigus, was sudden and severe. Within 24 hours, this patient's disease had almost reached its peak, and from that time on it gradually improved. The third factor is that the course of the disease lasted a total of 19 days. Pemphigus, however, is characterized by a longer term with exacerbations and remissions, and ultimately a fatal outcome.

There is one special type of pemphigus that could most likely be confused with this type of disease, and that is pemphigus of the mucous membranes, or localized pemphigus. This type is characterized by outbreaks of bullae in various areas of the skin, but occurring only in involvements of small areas at a time. There are then relapses with similar small areas showing the involvement, but ultimately the reaction becomes generalized. All of the skin and mucous membranes are affected, and the disease terminates fatally. It has a chronic course.

As Dr. Grove mentioned, Duke-Elder in his conclusions includes in the eye involvement of erythema multiforme, three types: the catarrhal, purulent, and pseudomembranous stages. He believes, and I think most of us agree with him, that these are changes in degree rather than in type. In other words, the pseudomembranous type shows the most severe changes in erythema multiforme involving the ocular structures. That point is aptly demonstrated by the penile lesion in this case. It bears a very close relationship with the ocular lesion, and shows a similar bandlike scar holding down the prepuce to the glans.

Dr. W. Zentmayer said that he did not wish to discuss the paper itself, but that he wanted to speak about the title of the paper. This was no criticism of the authors, because they have a precedent for the titles they use. When a general disease commonly has eye complications, it would

seem a questionable procedure to make an entity out of cases that happen to have eye complications that are a little more severe. By the same token, one might just as well speak of the Wheeler syndrome, because Wheeler's case was much more severe, developing panophthalmitis with loss of the eye. It would seem that it is pretty difficult to make out an entity for this group of cases of erythema exudativum multiforme. Furthermore, there is objection to using authors' names to designate a syndrome. The title gives no indication as to the subject matter of the paper. If one wants to search the literature for a certain condition, he may overlook cases that are published as an author-named syndrome.

Dr. Burton Chance said that he agreed with Dr. Zentmayer. It is quite difficult to know exactly to what the names of those two gentlemen might refer. The title would have been understood if it had denoted a special type of multiforme erythema.

Acquired ophthalmic allergy

Major William F. Bonner (MC), A.U.S. (by invitation) discussed this subject. He said:

1. Acquired allergy may be single or multiple.

2. The most common offender is atropine, which may cause dermatitis and intraocular hemorrhage.

3. Quinine amblyopia may be acquired, and the one case reported was helped by 50,000 units of vitamin A, three times daily.

4. Hemorrhagic allergy was improved by padutin.

Keratitis associated with lymphogranuloma venereum

Dr. Harold G. Scheie and Dr. Alan S. Crandall (by invitation) discussed four patients who had identical corneal lesions of a distinctive type associated with lymphogranuloma venereum. Evidence supporting the designation of the lymphogranuloma-venereum virus as the etiologic agent was considerable. (1) The corneal lesion was so characteristic as to suggest the diagnosis of lymphogranuloma venereum in all of these patients. (2) Diagnosis of the systemic disease was further established by additional clinical or laboratory evidence or both. (All had positive Frei tests. Two had scars of healed bubos and one had active inguinal involvement. The fourth patient showed no other clinical evidence of lymphogranuloma venereum, but did exhibit a strongly positive complement-fixation test, and a biopsy of the corneal lesion showed histologic changes compatible with the disease.) (3) The corneal lesion was always found associated with a positive Frei test and never with any disease other than lymphogranuloma venereum. (4) The lesions were identical with those occurring in a patient having lymphogranuloma venereum reported by Meyer and Reber in 1940.

Discussion. Dr. Henle said that they had had the opportunity to study in the laboratory one of the cases Dr. Scheie had just presented. The results obtained, thus far, served well to demonstrate the possibilities as well as the limitations of a diagnostic laboratory for virus infections. There are three general approaches to the laboratory diagnosis of a virus disease:

1. The isolation and identification of the causative agent.

2. The determination of the serologic response in the patient.

3. The demonstration of characteristic pathologic lesions.

All three approaches were used in this case. In discussing it, he would like to begin with the third approach, the demonstration of characteristic lesions. Part of the material obtained by biopsy from the cornea was sectioned and stained with Giemsa's stain. On examination many

epithelial cells were found and, in some regions of the section, practically all of them contained cytoplasmic inclusions. These consisted of aggregations of small, round bodies staining dark purple. In many places, individual or small groups of these particles were found. They had a diameter of between 200 and 300 mu, and probably represented the elementary bodies of the virus involved in this case. In lymphogranuloma venereum, such inclusions were first fully described by Miyagawa as granulo-corpuscles.

The serologic studies were likewise in accord with what one would expect to find. The complement fixation test with lygranum antigen (Squibb) was high, giving a serum antibody titer of 1:256. The antigen used was the same as that employed for the Frei test, which also was positive as Dr. Scheie pointed out.

As for the isolation of the causative agent, studies were not completed, as yet. The number of elementary bodies visible in the section would imply that the virus should be isolated with ease. On the other hand, the high antibody level in the patient's serum may cause considerable difficulties. In order to release the virus from the cells, the tissues have to be emulsified by grinding in a mortar with an abrasive, and it is impossible to avoid the contact of antibody with the virus; thus, some virus may be neutralized before the injection of the emulsion into experimental animals.

The first attempt at isolation of the virus was made by intracerebral injection of white mice.They developed no lesions. On the 12th day they were killed and their brains, after emulsification, passed to new mice. Again no lesions developed, and this line was discontinued.

A second attempt was made in the chick embryo. In this case the remaining material from the biopsy, which had been kept at −10°C., was injected into the yolk sac of eight-day-old chick embryos. They survived eight days of further incubation when the yolk sacs were harvested. A 20-percent suspension was passed to new eggs and also to white mice by the intracerebral route. These mice showed some signs of cerebral lesions on the fourth and fifth day. They lost weight, and on suspension by their tails they exhibited tremor, and on release had difficulties in regaining equilibrium. Passage of the brains from these mice to other mice produced severer lesions and death. As can be seen, there is a chance that the agent has been isolated from the biopsy material. If so, it has to be identified by neutralization of the agent with known specific immune sera as well as with the patient's serum. The possibility of having activated a latent virus in the mice has to be excluded.

What do the various data imply? The virus of lymphogranuloma venereum belongs to a group of agents which have been classed together on account of various properties they have in common. In this group of agents we find, besides the lymphogranuloma-venereum virus, the agents of psittacosis, ornithosis, meningopneumonitis, trachoma, inclusion blenorrhea, mouse pneumonitis, and others. They all form similar cytoplasmic inclusions and exhibit serologic cross-reactivities. Neutralization of the toxic activity of these agents, described by Rake and Jones, constitutes the most specific test and serves best to differentiate between the various viruses of this group.

From the data presented, there is little doubt that the agent involved in the presented case belongs to this group of viruses, but we cannot say as yet with definite assurance that it is a strain of lymphogranuloma-venereum virus. Although all results seem to be in accord with this diagnosis, a differentiation between the various inclusions cannot be made with sufficient accuracy. The high complement-fixation titer with lygranum

antigen appears quite significant, but may not be out of the range of cross-reactions observed with some of the other viruses of this group of agents. Fairly strong cross-reactions with lygranum antigen have been reported, for instance, with serum from cases of psittacosis and of pneumonitis. The Frei test, too, has been found weakly positive in some cases of psittacosis, meningo-pneumonitis and atypical pneumonia. The final diagnosis hinges on the isolation and characterization of the causative agent.

Dr. I. S. Tassman said that he would like to ask Dr. Scheie whether he observed the characteristic conjunctival lesion in any of these cases of lymphogranuloma venereum. He believes that the typical lesion occurs on the conjunctiva in this disease, and it seems unusual for keratitis to occur as a manifestation of this condition. Can Dr. Scheie tell just what it was that made him recognize this form of keratitis as typical or characteristic of lymphogranuloma venereum?

Dr. Tassman had recently observed two cases similar to the ones described. These cases cleared up under treatment with sulfa drugs, and a third case improved with penicillin treatment. There was no clinical evidence of lymphogranuloma venereum present in any, although laboratory tests were not made.

As was pointed out by Dr. Henle, there are several other conditions in which the Frei test may be positive. It does seem that Dr. Scheie's case in which the laboratory findings were positive can be accepted as a real case of lymphogranuloma venereum. In the others, however, the diagnosis would be a presumptive one.

Dr. Warren S. Reese asked whether this lesion had any resemblance to the so-called salmon patch seen in interstitial keratitis.

Dr. George F. J. Kelly asked: Does sulphonamide therapy alter the findings of subsequent Frei tests? The recurrences that were reported in two cases were thought to be due to inadequate treatment. Is there any known standard of treatment to prevent recurrences?

Dr. Alan S. Crandall said that it might be interesting to mention how the presumptive diagnosis was made in the last case. The patient had been seen several times, and lymphogranuloma venereum was not suspected. While the case was being studied, it was compared with a picture which Dr. Scheie had brought back from India. This picture showed keratitis in a patient diagnosed as having lymphogranuloma venereum. The similarity of the lesions was so striking that an immediate study of the patient was made with this disease in mind.

From the study of these few cases, Dr. Crandall believes that the lesion is characteristic of lymphogranuloma venereum. However, by the time the lesion becomes typical, there is permanent corneal damage. There will be some scarring and vascularization. It would be well if the index of suspicion were high enough so that the patient could be treated adequately before permanent damage occurs. It is important to reiterate the need for continuous treatment for a period of at least three weeks. The two patients who did not do well did not keep up adequate therapy.

Dr. Harold G. Scheie (closing) said that he believed there was little question that the lesion discussed was primarily a keratitis rather than a conjunctivitis. In the one case seen early, the onset was associated with symptoms of conjunctivitis, but promptly the corneal lesion appeared. All of the patients herein discussed, as well as the one of Meyer and Reber, seemed to show only secondary injection of the conjunctiva. There were no granulating lesions on the conjunctiva, and adenopathy was not observed.

The appearance of the corneal lesion seems characteristic and specific for the

disease. Most important is the slitlamp examination. The involvement of the cornea is through its entire depth. The lesion first appears within the upper limbus. Two of these patients subsequently developed a similar corneal infiltrate within the lower limbus, which also became vascularized. The vascularization seems quite characteristic. The vessels are all superficial and resemble an epaulette extending onto the cornea from the upper limbus, elevating its service. The vascularized area does not stain. The lower border of the vascularized area is very sharply delimited; no isolated vessels grow into the infiltrate in front of the vascularized zone.

The patient first seen in the clinic of the Hospital of the University of Pennsylvania by Dr. Crandall was seen and discussed at one of the weekly conferences. The final conclusion reached by the staff members was that, because of the new vessels and the elevation of the surface of the cornea, neoplasm had definitely to be excluded as a diagnostic possibility.

Dr. Reese asked what resemblance these vessels had to the salmon patch of interstitial keratitis. The vessels in keratitis associated with lymphogranuloma venereum are superficial rather than deep as in interstitial keratitis.

Dr. Kelly asked about the effect of sulfonamide on the Frei test. It has none, and the Frei test remains positive for life. This explains why the Frei test can be confusing, and the diagnosis of lymphogranuloma venereum as the cause of any lesion must remain presumptive until the virus can be recovered.

The fourth patient presented was the most conclusive case. She had a positive Frei test, and, in addition, a very strongly positive complement-fixation reaction. A biopsy of the corneal lesion showed changes compatible with a diagnosis of lymphogranuloma venereum and now the virus inoculations seem to be showing positive results.

Finally, none of us has seen this corneal lesion in any patient not showing at least a positive Frei test for lymphogranuloma venereum. Even so, the diagnosis is presumptive at this point.

Pigmented nevus of the iris treated by iridectomy

Dr. James S. Shipman and Dr. Robb McDonald presented a white woman, aged 59 years, who had had a spot on the iris of the left eye for as long as she could remember. Recently she had noticed that it had increased slightly in size. A tumor was noted in the lower temporal quadrant of the left iris, extending from about 1 mm. from the pupillary margin to the iridocorneal angle. The ciliary body was not involved. The tumor was removed by iridectomy, both operation and convalescence being uneventful. A diagnosis of leiomyoma was made by Dr. DeLong, and of nevus by Dr. A. B. Reese. Dr. Reese stated that this was a true nevus of the iris because nevus cells were present.

The tumor was completely removed at the time of operation. When the patient was last seen, vision in the left eye was correctable to 6/6.

Discussion. Dr. Perce DeLong said that the tumor under question had been submitted to many pathologists, and varied diagnoses were obtained. Some pathologists expressed belief that it was of a malignant nature. Others said that it was a nevus in an unusual location in the iris. Others agreed that it was a myoma.

Nevae usually grow from the anterior surface of the iris. This neoplasm arose from the substructure. It is quite unusual for a nevus to develop from this location.

The microscopic picture showed no special arrangement of cells; that is, there were no alveolar arrangements of cells commonly spoken of as nevoid bodies, nor did it contain epithelioid cells—both so

common in nevi. Instead, the cells were arranged in whorls. They were long, spindle cells and possessed many fibrils. Also, with the phosphotungstic-acid stain, the nuclei showed acidophilic reaction, a characteristic so common of myomas. For this reason Dr. DeLong felt that they were dealing with this type of neoplasm.

Dr. W. Zentmayer said that in one of two cases he had treated, the same difference of opinion existed among pathologists. The boy had had a fleshy looking growth of the iris, which was removed after the technique described in the case just reported.

The diagnosis of the first pathologist to examine the growth was leukosarcoma. He submitted it to a second pathologist who made a diagnosis of leiomyoma. Because of this difference of opinion, it was examined by a third pathologist who confirmed the diagnosis of the first pathologist. It was later studied by Colonel Ash who agreed with the second pathologist that it was a leiomyoma.

Dr. W. E. Fry said that he had had the opportunity to see this patient at the time of operation as well as to view the slides after the section was prepared. The case was somewhat similar to one which had been seen previously by him and by Dr. Adler and by Dr. Waite. The chief difference was that in the case he saw a contact glass was useful to determine a free angle.

After viewing the slides of the case presented by Dr. Shipman and Dr. McDonald, and after talking to both Dr. DeLong and Dr. Reese, he thought there were reasons for differing opinions. There could be some controversy in regard to the cells the slides showed. He believed this was a tumor in which the pigment-bearing cells were important, a malignant melanoma. Certainly the treatment of the patient was correct.

Dr. Burton Chance said that Dr. Zentmayer's case had certain aspects which were quite like those in one of his patients. The tumor was removed in a manner similar to that described by Dr. McDonald. The man had received a number of different diagnoses. For five years, there had been a gradual, yet appreciable, growth of the tumor. It proved to be a mixed-cell sarcoma. The patient had insisted that the eye be removed immediately if the mass were malignant, and he had assumed the burden of the decision. With the assent of Drs. Posey and Madison Taylor, an otherwise perfectly healthy eye was excised. That was 20-odd years ago. Recently Dr. Chance had learned that the patient had been in perfect health ever since the operation.

Dr. Edmund B. Spaeth said that he had never seen a more beautiful photograph of an eye than the one showed by Dr. McDonald in his presentation. The photographs shown by Drs. Grove and Scheie in their presentations were also excellent. Presentations like these show the value of good photography in recording pathologic conditions.

Dr. James S. Shipman (closing) said that no less an authority than Duke-Elder states that at the present time our ideas as to the nature and classification of neurectodermal tumors are somewhat in a state of flux. It was not until 1910 that Verocay showed that these tumors were derived from a proliferation of the cells of the sheath of Schwann, indicating that they were of ectodermal origin.

Masson, 1926 to 1932, confirmed this opinion and more or less revolutionized all previous conceptions of neuroneoplasms. His researches were also confirmed by Stewart and Copeland, 1931; Foot, 1932; and others. Masson showed that cutaneous nevi arose from a neoplastic proliferation of the specialized end organs of the cutaneous nerves; namely, the Meissner corpuscle in the derma, and the Merkel-Ranvier cells, and the chromatophore, which are special types of

cells in the basal layers of the epithelium.

As a result of this finding, according to Duke-Elder, it appears that a number of tumors which used to be described in the literature as neurofibroma, plexiform neuroma, ganglionic neuroma, nevus, melanoma, and some types of sarcoma are neurogenic in origin, the fundamental cell of origin being the cell of Schwann.

According to Duke-Elder and Algernon Reese, nevi usually occur in the skin, conjunctiva, or at the junction of these two, and they are neuro-epithelial in origin, springing from the end apparatus of the sensory nerves which may be pigmented or nonpigmented.

The term melanoma seems to have been rather loosely used to describe a pigmented tumor in any part of the body and has no real value so far as indicating the origin or malignancy of the tumor. As has been pointed out in the presentation of this case, a pigmented tumor may be congenitally present in an iris for many years with no evidence of growth or increase in size until suddenly, for some unknown reason, it takes on the characteristics of malignancy as evidenced by its increase in size and extension into the angle of the anterior chamber, giving rise to some increase in ocular tension.

Certainly these signs should always make one feel very suspicious of malignancy and advise surgery, such as was done in this case, with the hope of removing the tumor in its entirety before it has invaded too far into the angle of the anterior chamber.

This case demonstrates the necessity of careful observation. Dr. Roth, who saw this patient and referred her to me, is to be congratulated for his acumen and for his judgment as to the time for surgical intervention. I am indebted to him for having referred this patient to me. I am more indebted to Dr. Zentmayer who confirmed our opinion as to the operation to be performed, and, more than that, for having shown me just how to do this operation. I had the pleasure of being his assistant at a similar operation for just such a tumor of the iris about 19 years ago when I was a resident at the Wills Hospital.

This case has been presented as a preliminary report with the hope of stimulating some discussion and interest in tumors of the iris. Dr. McDonald and I hope to give a more complete report of this case at a later date when a more definite diagnosis has been agreed upon.

George F. J. Kelly,
Clerk.

CHICAGO OPHTHALMOLOGICAL SOCIETY

March 18, 1946

PETER C. KRONFELD, *president*

CLINICAL PROGRAM

The Fundus Clinic at Cook County Hospital was presented. One hundred twenty-eight cases were shown, including 48 cases of vascular disorders and diabetic retinopathies, 14 cases of diseases of the optic-nerve head, 16 cases of specific retinal inflammatory lesions, and 18 cases of traumatic retinopathy. Nine cases of congenital fundus defects were also shown. The miscellaneous group included anemias and various blood dyscrasias with retinal pathology, as well as degenerative diseases of the retina.

GLAUCOMA FOLLOWING INTRACAPSULAR CATARACT OPERATIONS

DR. IRVING PUNTENNEY presented this subject, an abstract of which follows.

The incidence of glaucoma following extracapsular cataract varies. Most observers attribute this type of glaucoma to obstruction of the filtration angle. A comparison of the incidence of glaucoma fol-

lowing intracapsular cataract extractions shows an advantage in favor of the intracapsular extraction. Glaucoma, when it occurs, is often the end result of certain anatomic changes which have been brought about during the course of the operation. During the last two years 16 cases of glaucoma were studied and treated. The glaucoma followed Verhoeff intracapsular extractions. No mathematical figures can be given as to incidence, because the operations were not performed by the author. Analysis of the findings in uncomplicated extractions, however, reveals that approximately 65 percent of the patients had mushrooming of the vitreous, together with adhesions of the iris pillars to the corneal incision. This was usually associated with peripheral anterior synechiae. Delayed reformation of the anterior chamber occurred in approximately 33 percent of the cases, and an equal number had an iris collar. A study of the findings in the complicated extractions showed that all patients had vitreous in the anterior chamber, with adhesions of the iris and iris pillars to the cornea. Vitreous was adherent to the incision in 75 percent of patients. An iris collar was present in 25 percent, and iris prolapse occurred in 50 percent.

In general, most cases of glaucoma appeared to result from complications which occurred during or following delivery of the lens. It is possible that preoperative gonioscopy would have revealed peripheral anterior synechiae in a large number of these patients but, nevertheless, the precipitating factor seemed to be a shift in the position of the vitreous with mushrooming of the vitreous into the pupil, formation of anterior peripheral synechiae, adhesion between the iris columns and the cornea, adhesions between the vitreous and the cornea, the presence of an iris collar, and iris or vitreous prolapse.

Prevention of this type of secondary glaucoma depends upon four factors:

1. Ability of the operator to remove the lens without disturbing the vitreous.
2. Maintenance of the normal position of vitreous and iris.
3. Early restoration of the anterior chamber.
4. Elimination of an iris collar at the base of the iridectomy.

Discussion. Dr. Bertha A. Klien spoke of the emphasis placed by Dr. Puntenney on the prominent role of the vitreous in the pathogenesis of certain types of secondary glaucoma, and showed slides to illustrate some of the consequences of dislocation of the vitreous; that is, a herniation or prolapse into the anterior chamber or an incarceration into a penetrating scar. In many histologic preparations it is seen that, driven out of its normal habitat, the vitreous stimulates growth of certain cells of the tissues of its new surroundings. Dislocated vitreous may be covered gradually by corneal endothelium and new Descemet's membrane. It may be invaded by newly formed keratoblasts, which gradually solidify strands of vitreous by production of a substance similar to corneal parenchyma. Herniating or prolapsed vitreous may become rapidly anchored to the anterior surface of the iris by proliferation over it of the anterior border-layer endothelium, producing occasionally occlusion of the pupil or, in the case of a coexisting hemorrhage, by formation of a network of phagocytic wandering cells, which are deposited on its surface and gradually take on the appearance of fibroblasts.

Membranes formed by growth of such a variety of cells over and into the vitreous gradually shrink and may thus dislocate the vitreous still further and, in this way, perhaps exert traction upon portions of the ciliary body and produce a rise of tension by irritation of the ciliary processes.

It would be interesting to know

whether cyclodiathermy, which would be the operation of choice in such a condition, has proved to be especially successful in the treatment of secondary glaucoma after intracapsular lens extraction with damage to the vitreous.

Dr. William F. Moncreiff said that, for a round-pupil extraction, three corneoscleral sutures are of great value for the prevention of iris prolapse. Three mattress sutures are equivalent to six sutures, the wound is airtight and the anterior chamber can be immediately restored by filling it with an air bubble. Remnants of the air bubble may remain even for four days when the chamber has been well-filled. To avoid a shift in the position of the vitreous toward the wound, one must rely on retrobulbar injections to reduce the tension, avoidance of undue pressure on the eyball, and, of course, the proper handling of the eye in all respects.

If the extraction is performed properly, the vitreous should not suffer any disturbance unless it is adherent to the lens, which is quite an uncommon condition. If fine sutures (0.004 or 6.0) are used, it will be found that one, two, or even three of the sutures when properly tied will cut out spontaneously on the corneal side within a week or two.

Dr. H. Saul Sugar emphasized the role of delayed reformation of the anterior chamber after extraction from the point-of-view of the gonioscope, by means of which the main factor of the formation of peripheral anterior synechiae has been observable. The vitreous is much more easily visualized gonioscopically when present in the chamber than one would imagine. Three things might be done to prevent glaucoma after cataract extraction, intracapsular or extracapsular. The round pupil has advantages particularly after intracapsular extraction. The use of eserine after operation keeps the angle of the anterior chamber open. It also has a tendency to limit mushrooming of vitreous into the anterior chamber. In addition, corneoscleral sutures, plus filling the anterior chamber with bubbles of air, will aid in preventing this type of glaucoma.

Dr. Thomas D. Allen congratulated Dr. Puntenney on this excellent presentation, and felt that Dr. Klien's pictures were extraordinarily illuminating. He favored the use of the tonometer routinely in preoperative study. Following instillation of homatropine, the use of the tonometer shows what dilation of the pupil has done to the eye and may show the possibility of glaucoma. He agreed on the advisability of waiting four days postoperatively before dressing the eye, and was quite convinced that much less postoperative glaucoma ensued if nature were allowed to take its course. Allen Greenwood said, some years ago, that anterior peripheral adhesions were due to incorrect use of the iris spatula in the postoperative toilet of the wound, that sometimes the back of the cornea was touched, and cells detached from Descemet's membrane, so that when the wound is closed, the iris is likely to become adherent. Insertion of air into the anterior chamber aids in replacing the iris, but Dr. Allen had the feeling that it might act as a foreign body.

Dr. Louis Bothman mentioned that often posterior synechiae occur after cataract operation without glaucoma. He wondered if Dr. Puntenney had any figures on the percentage of cases with glaucoma as compared with those which have synechiae without glaucoma.

Dr. Erwin E. Grossman recalled a study, made several years ago with Dr. Kronfeld, on the role of peripheral anterior synechiae in connection with glaucoma in aphakic cases. He felt that this study gave overwhelming evidence that the main cause of glaucoma was synechiae. In the cases of glaucoma without anterior synechiae, other causes were

found. Iritis was one of these causes.

In the cases of glaucoma with synechiae, the degree of glaucoma varied with the extent of the synechiae. Those cases that had glaucoma and no anterior synechiae seemed to respond very well to medication; whereas, those with extensive synechiae usually went on to surgery. More than 100 cases were included in the study.

Dr. Peter C. Kronfeld emphasized what Dr. Sugar and Dr. Grossmann said. The paper of Drs. Grossmann and Kronfeld (*American Academy of Ophthalmology and Otolaryngology*, 1941) showed a definite quantitative relationship between the extent of the anterior synechiae and the incidence and severity of glaucoma. Mushrooming of the vitreous into the anterior chamber is very common in aphakic eyes that do not have glaucoma. So far as Dr. Kronfeld could determine, corneoscleral sutures, which in principle consist of horizontal bites, should be named after Liegard and not after Kalt.

Dr. Irving Puntenney (closing) thanked Dr. Klien for her interesting and scholarly discussion. He was pleased to hear Dr. Moncreiff discuss the value of introducing air into the anterior chamber. He doubted that it acted as a foreign body and believed it could do no harm unless bacteria were introduced at the same time. Some men prefer to fill the syringe by sucking the air through moist gauze. The gauze is not a very efficient filter but may help to eliminate airborne bacteria.

It is necessary for the operator to be able to pull up the corneoscleral suture immediately after delivery of the lens. The technique described was used as a routine measure by Dr. Sanford Gifford, and many cases have been seen where speedy closure of the wound prevented vitreous loss.

Dr. Sugar's discussion was also appreciated, and the recent work of Sugar, Kronfeld, and Gradle gives far more information on the subject than this paper. In response to Dr. Allen, the use of the tonometer should be stressed in recording intraocular pressure. It is a mistake to rely on tactile pressure and, if this is done, numerous glaucoma cases will not be diagnosed until field defects are present. It is not necessary to postpone routine eye dressings until the third or fourth day, unless the patient is apprehensive or there is a tendency to vitreous prolapse.

In answer to Dr. Bothman, no percentage can be given because gonioscopy was not done in all cases. However, the answer could be found in Dr. Kronfeld's work. The present study could not be carefully controlled; the findings herein discussed were readily seen not only with the gonioscope but also with the slitlamp.

Modification of cataract discussion in the preschool age group

Dr. William F. Moncreiff presented a paper on this subject which was published in this Journal, December, 1946, volume 29, page 1513.

Discussion. Dr. James E. Lebensohn said that cataract before the age of six years, in what Dr. Moncreiff aptly terms the preschool group, can be considered a rather definite clinical division since all forms of cataract within this period characteristically have but a slightly differentiated and unresisting nucleus. He had observed some of Dr. Moncreiff's cases and was impressed by the results. The operative management has certain essential features:

1. Both eyes are operated on at the same sitting, if the condition is bilateral. Considering the slight risk involved this procedure is logical, as it minimizes hospitalization and promotes binocular vision.

2. Maximal mydriasis is maintained both before and after operation. In preoperative preparation it must be empha-

sized that only spastic mydriatics, such as 10-percent neosynephrin or 1- to 2-percent adrenalin, ensure full dilation of the pupil after loss of aqueous.

3. A wide opening of the capsule is accompanied by thorough fragmentation of the lens, avoiding, however, entry into the vitreous. Before spastic mydriatics were introduced in ocular surgery a similar method was practiced by Emmert in 1903, but because of increasing tension, a linear extraction regularly followed 24 hours later. Dr. Moncreiff reasons that the mechanics of such tension rise is associated with swollen lens substance trapped behind the iris and claims that, with his technique, this complication is adequately avoided.

4. Some aqueous is allowed to escape. This step, which was not permissible when atropine was the only mydriatic available, is physiologically sound, as the plasmoid aqueous which follows has a much higher content of proteolytic enzymes.

5. The last detail is irrigation of the anterior chamber to displace lenticular remnants from the capsular sac. In Morgagnian cataract, it is generally agreed that the milky-white fluid released by discission must be immediately evacuated. Does Dr. Moncreiff find his simple irrigation adequate in such cases, or must the discission wound be enlarged?

Few surgeons doubt the desirability of leaving the vitreous untouched. A coating of vitreous probably delays the absorption of lens matter. Even worse, after the discission needle penetrates the vitreous, a fine thread of the humor is almost invariably carried back to the wound. Infection may thus gain entrance, or later retinal detachment may follow from adhesion of vitreous to the corneal scar.

Dr. Moncreiff regards about one year as the youngest age suitable for operation because only then can the pupil of the eye be adequately dilated. In this he is in practical agreement with Treacher Collins, who concluded, because of other structural features, that 10 months should be the minimal age.

Other details of the discission operation are worthy of attention. As Jackson maintained, it is safer to introduce the needle through the vascular limbus than through the clear cornea. As a further precaution, Herbert provides the wound with a covering by sliding the mobile conjunctiva to the point of puncture.

The surgery of soft cataracts has a long and dramatic history. Percival Pott, in 1775, was the first to propose laceration of the capsule as a distinctive method. About 30 years later, Saunders demonstrated its value in children, and his first report listed results on 14 persons born blind, one of whom was only two months old. In the years since, many patients have been acutely troubled by strings attached to the gift of sight, strings of vitreous, capsule, and lenticular debris. Dr. Moncreiff has tackled the problem with insight. His solution deserves the earnest consideration of all eye surgeons.

Dr. Glenn Harrison assumed that one inserts the irrigator through the same opening made by the knife-needle, and that the excess irrigating fluid would be expelled through this opening. Since the Ziegler knife-needle would have too long a blade to permit extensive manipulation inside the anterior chamber, does Dr. Moncreiff use a special knife-needle?

Dr. Peter C. Kronfeld said that the procedure advocated and practiced by Dr. Moncreiff may be described as maximum comminution of the lens by multiple incisions and dislodgement of the comminuted material into the anterior chamber by irrigation, both procedures being accomplished through a minimal opening in the eyeball wall.

Multiple, but not through-and-through incisions of the lens, were advocated by Straub. Intentional dislodgement of lens

material or, more specifically, the nucleus into the anterior chamber for the purpose of comminution, was practiced by Krueckmann. To use irrigation for this purpose is Dr. Moncreiff's original and valuable contribution.

While his series of cases is small, it is remarkable that he obtained optically satisfactory conditions with just one operation in six consecutive eyes. A larger series of cases will be necessary to prove that the dislodgement of the lens material from behind the iris into the anterior chamber constitutes an antiglaucomatous factor. In Dr. Falls's series, glaucoma occurred only in 8 percent of the operated eyes. There is no definite concept concerning the mechanism of such glaucomas. Even though most of the anterior chamber may be filled with fluffy lens matter in these cases, it is highly probable that the upper half of the angle is open and functioning. Thus, the concept of angle obstruction by lens material in the anterior chamber is probably too diagrammatic.

With regard to the work of the other authors mentioned by Dr. Moncreiff, Dr. Falls has said that the procedure at the University Hospital of the University of Michigan has been "rather deep incisions with rather deep vigorous stirring of the cortex of the lens."

It was Dr. Kronfeld's feeling that Ziegler's through-and-through needling operation had been abandoned, and that Dr. Moncreiff's criticism of the procedure was, therefore, rather unnecessary. Dr. E. B. Spaeth of Philadelphia, however, stated that there are still people who practice the Ziegler through-and-through needling operation. Dr. Spaeth, himself, considers it an obsolete and dangerous procedure (personal communication). Dr. Kronfeld was in agreement with Dr. Moncreiff and Dr. Spaeth in that (1) interference with the anterior vitreous should be avoided whenever possible and (2) through-and-through incisions of the lens offer no advantages so far as comminution and absorption of the lens material is concerned. There is definite hope that Dr. Moncreiff's procedure will simplify the treatment of congenital cataract.

Dr. William F. Moncreiff (in closing) said, in reply to Dr. Harrison, that the knife-needle has a blade of which the sharp edge is practically straight, and is about 2.75 mm., or at most 3 mm., in length. Concerning escape of fluid, the shaft of the knife-needle should fill the incision and prevent loss of the anterior chamber during the entire discission part of the procedure. Should aqueous be lost inadvertently, the chamber can be filled with the irrigator, and the knife-needle reinserted. Introduction of the tip of the irrigator two or three times is not likely to cause infection, and the routine use of penicillin as a prophylactic is neither desirable nor necessary.

It is common knowledge that lens substance absorbs most rapidly and completely when free in the anterior chamber, and free from any enclosure in the capsule. This is often seen, particularly in those cases where more than the usual amount of cortex remains after extracapsular extraction. It was seen more frequently in former times when irrigation of the anterior chamber was not routine in the extracapsular extraction. As Dr. Lebensohn said, Percival Pott, almost 200 years ago, attempted in the discission of congenital cataract to dislocate some of the lens substance into the anterior chamber with the knife needle. Obviously, the method described here was arrived at quite independently. As to the Ziegler operation, it is true that most good eye surgeons consider it dangerous, but it is currently used and endorsed, if not actually defended, by two very prominent eye surgeons, one of whom is still quite active.

Richard C. Gamble,
Secretary.

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BIOGENIC STIMULATORS

Third Witch:

Scale of dragon, tooth of wolf
Witch's mummy, maw and gulf
Of the ravin'd salt-sea shark,
Root of hemlock digg'd i' the dark,
Liver of blaspheming Jew,
Gall of goat, and slips of yew
Sliver'd in the moon's eclipse,
Nose of Turk, and Tartar's lips,
Finger* of birth-strangled babe,
Ditch-delivered by a drab,
Make the gruel thick and slab:
Add thereto a tiger's chaudron
For the ingredients of our cauldron.

All:

Double, double, toil and trouble;
Fire burn, and cauldron bubble.

Second Witch:

Cool it with a baboon's blood,
Then the charm is firm and good.

Macbeth, Act IV, Scene I.

* Why not placenta?

The late Sanford Gifford said (*Handbook of Ocular Therapeutics*): "The difficulty in estimating the value of

therapeutic agents administered in an attempt to aid this mechanism (the defensive mechanism of the body) is, therefore, obvious. This explains the remarkable variance in reports of different observers and often of observers whose clinical judgment is usually very reliable, as to the effect of various therapeutic agents. A chance series of cases with a fortunate outcome may convert an ophthalmologist of unquestioned standing into an enthusiastic advocate of a measure which has little to recommend it theoretically, and which in the hands of other men may later prove absolutely worthless. Thus it is necessary to greet the first reports on the use of any new agent with a certain amount of reserve. Agents of recognized value should not be abandoned in favor of new ones unless the evidence in favor of a change is convincing. The evidence of a small number of case reports alone is apt to be unsatisfactory, and one will be slow to take up the use of a new method unless there exists a certain foundation of theoretical and experimental reasons why the new method is likely to prove of advantage."

The fundamental common sense in this thought of a great ophthalmologist bears repetition today, when one is bombarded by press releases of new and often astounding discoveries of cures in the medical sciences. The evils of premature, spectacular publicity are too well known to be discussed here, nor is it necessary to detail the harm done to the public, and eventually to the entire medical profession, by such propaganda, either willful or innocent. The history of medicine is filled with these false alarms that have misfired, or, what is less serious, backfired into the faces of those responsible. What we never discover is the total cost to the afflicted, either in mental distress engendered by their false hopes, or to their pocketbooks, which in our materialistic age seems to be more important. What is morally worse, by far, is the example set to our younger men who see the leaders "getting away with it" and thus are inspired to imitation.

Elsewhere in this issue will be found an article by Dr. Dan M. Gordon on the "Treatment of Retinitis Pigmentosa with Special Reference to the Filatov Method." It will bear careful study, for it details the history of the flotsam and jetsam of the wrecks of ideas regarding the treatment of this disease. This paper reëmphasizes what Duke-Elder has so ably expressed. "None of them (remedies for pigmentary degeneration of the retina), however, has shown anything approaching lasting or consistent results, and it is probable that the temporary improvement following many of them is due to an increase in the metabolic activity in the eye rather than to any specific action. In the assessment of all of them it is well to take into consideration the natural fluctuation in the progress of the disease, as well as the enthusiasm of the practitioner and the credulity or the desperate hopefulness of the patient."

One has no quarrel with Filatov and his co-workers over the attempt to treat this so far hopeless ocular condition by any means whatsoever, fantastic as those means may seem to us. The mysterious and at present unknown action of his "biogenic stimulators" requires investigations of the most rigid and controlled sort, before they can be hailed as the long sought philosopher's panacean stone of ocular therapeutics. The work of Gordon and others is an attempt to evaluate and clarify the premise of Filatov. It is necessary that such work be done, under most careful scientific scrutiny and in the Eye Institutes that are especially equipped to carry out such meticulous study.

It would seem, from a study of the available Russian literature, more or less

abstracted to be sure, that the tissue therapy of Filatov is a new way of introducing a foreign-protein reaction, although differing in some respects, perhaps, from such biogenic stimulators as milk, typhoid vaccine, and Coley's serum. A severe febrile reaction has been produced in a "moon-blind" horse by the injection of sterilized horse feces with some improvement of his periodic ophthalmia (author). Sterile abscesses have been created as biogenic stimulators by many means (seton, croton oil, cupping, sterile blood, and so forth) and "laudable pus" was celebrated a long time ago. In fact, the witches' brew of Shakespeare may well contain the pharmaceuticals we are looking for, if Filatov's work with offal is substantiated.

No, the quarrel is not with Filatov and his group, primitive and slightly obscene as his treatment may seem to be to us. It is with the noisy group of fellow travellers in this country who by aggressive publicity measures seek to promote this treatment in the press for political purposes. This is the true danger to science.

On April 28, 1946, the *New York Herald-Tribune* carried a descriptive announcement hailing in enthusiastic terms the Filatov method. The ophthalmologists of this country were besieged with requests by their patients, afflicted with retinitis pigmentosa, for this treatment. In a personal communication, Dr. Robert Leslie, business manager of the *American Review of Soviet Medicine*, stated that the American Society for Russian Relief issued this newspaper release to the press, which he had not authorized. However, in the June, 1946, issue of the *American Review of Soviet Medicine*, four out of the nine main articles were by Filatov, or Filatov and Verbitska, considering the treatment of retinitis pigmentosa and the fantastic results of their methods of treatment (85 successful results out of 110 cases). Dr. Leslie circularized the ophthalmologists of this country with letters calling attention to the articles and offering a copy of the issue for one dollar. The magazine *Newsweek* has carried several articles about this treatment, and not long ago a group was formed in New York, financed for the sole purpose of promoting and perhaps exploiting the Filatov treatment.

It is to the credit of American medicine that there has been no blind stampede into this grotesque field of therapeutics. Scientific work will rise or fall upon its own worth and integrity. Scientific truth will ultimately prevail and all the subversive trumpets in Christendom or in pagan countries cannot promote for long an issue that is basically unsound. They can only succeed in confusing us and hiding for a time fundamental errors. These noisy promoters often end up by mistreating the common man whom they pretend to protect and whose welfare they affect to coddle.

The danger to science of replacing the mortarboard by the pileus, the scarlet gown of the free doctor by the black shirt of Naziism or the red one of Communism, or by the star-studded hood of the necromancer, has been sadly demonstrated only too often in the past history of man's civilization. Politics and the state have no place in the premature exploitation of any medical discovery, regardless of the outcome.

Derrick Vail.

OPHTHALMOLOGICAL STUDY COUNCIL

The third and last of the Ophthalmological Study Council courses is to be given this summer in Portland, Maine. As is usual with the end approaching, the managers are just beginning to feel some confidence in their understanding and control of the problems raised by so

large an enterprise. So far as is known, this is the only attempt by any medical specialty to meet the needs of the five-year supply of prospective specialists with less than a one-year facility for training. These courses have turned out to be far more than a stop gap. They were outstanding among the very good courses given during the period. The instructors were picked from every part of the United States. Many of them were men with international reputations. The subjects covered were such as to give the students a more comprehensive training than the purely basic courses. Finally, by weekly examinations in the subjects under immediate consideration, an earnestness of application developed rarely seen in graduate study.

Examinations serve another important end. They rate the teacher quite as definitely as the student. If a few students fail in a course, the inference is that they can't or don't take in what the rest of the class are able to absorb. That is their fault. But if a large part of the class get "busted," that is an indication that the teaching was inadequate. The teacher is to blame.

The second Study Council course, given in St. Petersburg, Florida, in November and December, 1946, and part of January, 1947, profited by the criticisms of the Boston course made by the students. The physical arrangements were more convenient. The lectures were held in the same hotel that housed both faculty and students. Clinical demonstrations in refraction were included. In the curriculum changes were minor. The greatest difference was that the lecturers had their material better in hand.

To date approximately 150 applicants have taken the course at one or the other session. This leaves some 300 inquirers who have not been accommodated. While many of these may have given up specialization, other applications keep coming in. In one final attempt to accommodate all who need this instruction, the committee has made arrangements for a third and last session. It will be held during the coming summer, a time likely to be more convenient for both students and lecturers. It will be given in Portland, Maine, a resort center with an agreeable summer climate. The facilities of the Westbrook Junior College have been made available, affording housing, feeding, and classroom accommodations at far less cost than that of the previous sessions. Because of the general approval given the St. Petersburg course, no other important changes will be made. Faculty and curriculum will be essentially the same. The aim will be to prepare the students for preceptorships. If they have the good fortune to secure residencies, they will be better equipped to make use of these opportunities. Even inferior residencies will, therefore, become more useful.

With the completion of this session, ophthalmologists will have the satisfaction of knowing that their specialty alone has at least furnished an opportunity to many men who served their country at a large sacrifice and would not otherwise have ever had an opportunity to undertake proper training. At best it will have provided a creditable foundation for many ophthalmologists, at a time when there is a decided shortage of well-trained men.

S. Judd Beach.

THE PROCTOR RESEARCH MEDAL

The Association for Research in Ophthalmology has just announced a gift from Mrs. Francis I. Proctor of Santa Fe, New Mexico, for the endowment of a research medal in memory of her husband, to be awarded for outstanding research in the basic sciences as applied to

ophthalmology. Dr. Proctor was a Boston ophthalmologist who settled in Santa Fe after his retirement and became actively interested in experimental ophthalmology, particularly as applied to trachoma and other special disease problems of the American Indians. As Consultant on Ophthalmology to the Office of Indian Affairs, he induced Noguchi to undertake his investigations of trachoma which, although in themselves fruitless, inspired a series of researches by American and foreign workers which finally proved that the agent of trachoma is a virus belonging to the psittacosis-lymphogranuloma-venereum group of viruses. In view of Dr. Proctor's passionate interest in basic investigation and the help and stimulation he gave to it in his later years, it is particularly appropriate that this research medal be founded in his name.

The Proctor Medal will differ from the other medals in ophthalmology in being open to nonclinical workers in ophthalmology. There is an increasing number of basic-science workers attached to the large university eye clinics who will become eligible for it, as well as a smaller number who are not assigned to special eye departments but are doing their major research in basic eye anatomy, physiology, pathology, and so forth.

It is the intention of the association to award the Proctor Medal sparingly so as to insure its carrying distinction. At the same time, it will not be awarded so infrequently as to impair its value as a stimulus to basic research.

The Proctor Medal would appear to fulfill a definite need and should prove a fitting companion to the Howe Medals of the American Ophthalmological Society and the Section on Ophthalmology of the American Medical Association, and to the Knapp Medal of the Section.

Phillips Thygeson.

OBITUARY

SIR ARNOLD LAWSON
(1868-1947)

Sir Arnold Lawson, one of England's most widely known and best loved ophthalmologists, died on January 19, 1947, at the age of 79 years.

Following in the specialty of his distinguished father, George Lawson, surgeon-oculist to Queen Victoria, Arnold Lawson was educated at Taylors School in London and entered Middlesex Hospital as senior entrance scholar in 1886. He was qualified in 1891.

Sir Arnold served as clinical assistant to Sir John Tweedy at Moorfields, as ophthalmic surgeon to the Paddington Green Children's Hospital, and on the staff of Moorfields. In 1914, he became ophthalmic surgeon and lecturer on ophthalmology at Middlesex to whose staff he was appointed in 1910.

During the first world war, Sir Arnold resigned from all but the Middlesex appointment to devote himself to the blinded soldiers and sailors. It is for his work among these men at St. Dunstan's that he will be forever remembered. Hundreds of soldiers and sailors blinded either in World War I or II will miss his sympathetic understanding and kindly interest even more than they will miss the great knowledge and skill which he brought to the treatment of their blindness.

CORRESPONDENCE

Angle kappa in strabismus

For the accurate determination of the angle deviation in strabismus, when the latter is measured objectively on the perimeter, the value of the angle kappa has to be added to or subtracted from the value thus found. The angle kappa (often referred to as the angle gamma with which it is almost identical) is the angle between the visual axis and the pupillary

axis. The latter is the imaginary line through the center of the pupil, normal to the cornea. It is determined by the reflection in the center of the pupil of a small light held in front of the eye. Angle kappa is considered positive when the pupillary axis is temporal to the visual axis; it is considered negative when the pupillary axis is nasal to the visual axis.

Herewith is an easy way to remember when the angle kappa has to be added or subtracted in order to arrive at the true value of the angle of squint. The angle of deviation in convergent squint may be considered a positive angle and denoted by the plus sign. For convergence is a positive function and the angle of overconvergence may be thought of as a positive angle. Similarly, the angle of deviation in divergent squint may be considered as a negative angle and denoted by the minus sign. Divergence may well be thought of as a negative function; in fact, it is often referred to as negative convergence. Thus the angle of divergence from the point of fixation on the perimeter may be considered a negative angle.

If the angles are thought of in this way, all that is necessary is simply to add algebraically the values of the angle kappa and the angle of squint. Thus if the squint angle in convergent squint measures 15 degrees, and the angle kappa is plus 4 degrees, the true angle of squint is plus 15 and plus 4 equals 19 degrees. If the angle kappa in this instance is minus 4 degrees, then plus 15 and minus 4 gives us 11 degrees as the true angle of squint.

Or, if the angle of squint in divergent strabismus measures 20 degrees, we then have an angle of minus 20 degrees. If the angle kappa is plus 5 degrees, we get minus 20 degrees and plus 5 degrees, which gives us minus 15 degrees as the true angle of the divergent squint. If the angle kappa in this instance is, say, minus 5 degrees, then adding minus 20 and minus 5 gives us minus 25 degrees as the true angle of the divergent squint.

This method of considering the deviation angle in convergent squint as positive and the deviation angle in divergent squint as negative and then merely adding the value of the angle kappa is generally easier than other methods designed as memory aids.

(Signed) Joseph I. Pascal,
New York, New York.

BOOK REVIEW

LES YEUX ET LA VISION DES VERTÉBRÉS. By A. Rochon-Duvigueand. 792 pages. Paris, Masson et Cie., 1943.

This volume presents an exposition of the comparative anatomy and comparative physiology of the eye that is considerably more extensive than would be possible in a zoological handbook. The morphology of the human eye occupies the first 150 pages. The chapter on the origin of the vertebrate eye outlines the contributions of paleontology, comparative anatomy, and comparative embryology. The remainder of the book is a systematic exposition of the anatomy, histology, and the functions of the eye in each group of vertebrates. A chapter is devoted to the eyes of the cyclostomes, the several orders of fishes, the amphibians, the four orders of reptiles, the birds, and the mammals. Five hundred beautifully clear, half-tone illustrations, chiefly from histologic preparations, clarify the text instead of merely decorating it. They also decorate it. There is an adequate bibliography in each section.

F. H. Haessler.

ABSTRACT DEPARTMENT

EDITED BY DR. F. HERBERT HAESSLER

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is mentioned only in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy, embryology, and comparative ophthalmology

3

PHYSIOLOGIC OPTICS, REFRACTION AND COLOR VISION

v. Bahr, Gunnar. **The effect of peripheral rays in testing the light sense. A study on the importance of the pupillary area.** Acta. Ophth., 1941, v. 19, pt. 2, pp. 114-123.

This study was done on eight medical students, using the Gullstrand photoöptometer. The patient's head was held in position by biting into a cast of his teeth that was attached to an arm on the Zeiss chin rest. The arrangement permitted illuminating the desired areas of the pupil with a 2-mm. pencil of light. The examinations showed that beams entering the pupil from the nasal field through the peripheral portion of the pupil have less stimulating effect than those which pass through central portions, and that the effectivity can decline by about 30 percent. With a dilated pupil the effective amount of light is therefore not in direct proportion to the size of the pupil, except in its central portion. The data show that in light sense tests, which aim at discovering the function of the retina only the central pupillary area can be depended upon, and the pupil should be kept contracted with pilocarpine. (2 illustrations.)

Ray K. Daily.

DeVoe, A. G., and Dietz, V. H. **Plastic visual test plates.** Amer. Jour. Ophth., 1947, v. 30, March, pp. 325-326. (1 figure, references.)

Heinonen, Oscar. **Testing of color vision.** Acta Ophth., 1941, v. 19, pt. 2, pp. 109-113.

A candidate for railroad service was certified for normal color perception by one ophthalmologist, and was found color defective by another. The color perception of the mother was found defective. Inasmuch as all sons of a mother with defective color perception are color blind, the disagreement between the two ophthalmologists was decided by the findings on the mother.

Ray K. Daily.

Litinsky, G. A. **Fluctuating visual acuity.** Vestnik Oft., 1945, v. 24, pts. 1-2, pp. 36-38.

In a 22-year-old man with unilateral traumatic cataract the vision in his good left eye was normal, when his face was turned to the left, and was reduced to 0.1 with the head in the normal position. Litinsky found that the patient had an old paresis of the left external rectus muscle, and the effort of the paretic externus to hold the eye straight produced a nystagmus, which reduced the visual acuity. When the patient's face was turned to the left, the nystagmus disappeared.

The second patient had a divergent strabismus; he could hold his eyes straight with great effort. Monocular visual acuity in each eye was normal. Binocular acuity was 0.1. This reduction is explained by an artificial myopia produced by the excessive accommodation that was associated with the exercise of strong convergence.

Ray K. Daily.

O'Brien, J. M., and Bannon, R. E. **Accommodative astigmatism.** Amer. Jour. Ophth., 1947, v. 30, March, pp. 289-296. (2 figures, 4 tables, references.)

Pascal, J. I. **Cardinal points in aphakia.** Arch. of Ophth., 1947, v. 37, Jan., pp. 83-84.

The author presents a diagram to aid in remembering the cardinal points of the eye in aphakia. R. W. Danielson.

Pascal, J. I. **Pressure effects in contact lenses.** Amer. Jour. Ophth., 1937, v. 30, March, pp. 324-325.

Plicque, J. **Analysis of binocular vision. Part II, binocular synthesis.** Ann. d'Ocul., 1946, v. 179, May, pp. 255-279.

The first part of this essay was recently abstracted in this journal. Stereoscopic vision is an instantaneous phenomenon in which the sensorial factor dominates the muscular and in which the semiperipheral part of the retina is as important as the central part. In instantaneous perception the association centers add details to form a more or less complete mental picture which is of importance in the establishment of reading habits. Retinal correspondence is proved clinically and diplopia is practically impossible if it exists. In stereoscopic pictures two similar false images are presented before the eyes and create a false estimation of depth and direction because of an abnormal relationship between accommodation and convergence. Images on greatly disparate retinal areas normally are visualized separately but images on only slightly disparate retinal areas are, under certain conditions, superimposed and produce the impression of depth perception. The process of exteriorization is essentially centripetal and especially in binocular vision estimations of distance and direction are based on innate judgment as well as past experience. Binocular retinal impressions are localized at the reconstruction point of the principal and secondary axes. In a general way the horopter is the exteriorization of the visual impressions. Binocular alternation is an important factor in stereoscopic vision. Each optic radiation conveys only the impressions from the homolateral retina and therefore binocular alternation is considered essential for stereoscopic vision.

Chas. A. Bahn.

Wilson, W. H. **The Middle East adaptometer.** Brit. Jour. Ophth., 1946, v. 30, Nov., pp. 645-657.

The author describes his apparatus

for determining night blindness as assembled by his British Army unit in the Middle East. No such machine was available and materials of any acceptable sort were scarce. The construction of the instrument is described in detail. It served the R.A.F. quite adequately as a form perception test, rather than merely a light perception test. (4 figures.) Morris Kaplan.

4

OCULAR MOVEMENTS

Cristini, Giuseppe. **Clinical considerations on a case of progressive nuclear ophthalmoplegia.** Riv. Oto-Neuro-Oft., 1946, v. 21, March-April, pp. 98-107.

A woman, 30 years of age, with symptoms of pulmonary tuberculosis became afflicted at the age of 18 years with ptosis and paresis of the exterior muscles of the right eye after a long period of headaches and muscular and articular rheumatism. About 11 years later a ptosis of left upper lid and paresis of left internal rectus muscle appeared. The patient's eye condition could be diagnosed as chronic progressive nuclear ophthalmoplegia. That is a mesencephalic form of nuclear amyotrophia. (Bibliography.)

Melchiore Lombardo.

Dickmann, G. H. **Total extracapsular removal of tumors of the hypophysochiasmatic region.** Arch. de Oft. de Buenos Aires, 1946, v. 21, Jan.-March, p. 37.

The author uses the intradural approach, following Dandy's technique, for the removal of hypophysial tumors and favors the complete extirpation, rather than the curettage, of both the intra- and extrasellar portions of the growth. X-ray therapy must not be used as a sole treatment, but as a complement to surgery. Two cases operated on successfully, one of cystic adenoma and the other of glioepithelioma, are reported to illustrate the author's procedure. (Photographs, photomicrographs and visual field charts.)

Plinio Montalván.

Filippi-Gabardi, E. **A note on the significance of the cortical center for voluntary ocular motility.** Riv. Oto-Neuro-Oft., 1946, v. 21, March-April, pp. 132-135.

In a discussion of experimental and histopathologic data the writer endeavors to demonstrate that the frontocortical oculogiric center controls solely the horizontal or vertical ocular movements. It is not a specific center for voluntary ocular motility.

Melchiore Lombardo.

Gailey, W. W., and Morgan, G. E. **Surgical principals in strabismus.** Illinois Med. J., 1946, v. 90, Nov., pp. 274-279.

The essential questions arising in surgical care of strabismus are what muscle or muscles should be operated upon, how much is to be done, and what technique should be employed.

The choice of operation should be that procedure best known to the operator. The tenotomy is a useful operation when indicated and has been very successful when properly done. It is devoid of much of the trauma incidental to a recession. One of the indications for its application is in secondary contraction of a muscle.

Scleral trauma is to be avoided. The action of an operated muscle may be greatly affected by adhesions to the sclera central to its insertion. In reoperated eyes the authors have found the muscle firmly adherent as far back as the equator. Obviously, the muscle

action was correspondingly limited. Recession of the caruncle, an unfortunate and practically irreparable sequela can be avoided if there is less dissection of the conjunctiva and Tenon's capsule over the internal rectus.

How much to resect or recess is debatable and greatly depends on whether the anomaly is innervational, structural, or insertional. The authors' results in prism diopters of correction per millimeter of change in the position varied. The general principles laid down by them were: the maximum recession of a medial rectus should not exceed 4 to 4.5 mm., the lateral rectus 5.5 to 6 mm.; resection of lateral rectus 10 mm., medial rectus 5 mm.

Accuracy in diagnosis is strongly stressed. Especially important is the need for determining the status of the vertical muscles in all deviations. In combined deviations, correction of the horizontal deviation, if performed first, should be incomplete. The types of procedures recommended in the various deviations is discussed.

To facilitate orientation a dye dot is made at the 3, 9, 12, and 6 o'clock positions. Ten day chromic and plain catgut on atraumatic needles were found superior to silk sutures.

Frances M. Crage.

Schneck, J. M. **Voluntary nystagmus; case report.** Military Surg., 1946, v. 99, Sept., pp. 211-212.

The nystagmus in this young man was spontaneous, volitional, and bilateral. It was in the horizontal plane, pendular, very rapid, of large amplitude, and sustained. The movements of the eyes were symmetric. The oscillations were so rapid, once they were started by the individual, that they seemed to proceed in automatic fashion, in fact the factor of volition seemed present only at the beginning and end of the activity. Francis M. Crage.

5

CONJUNCTIVA

Alvarado, P. J. **Contribution to the study of vernal conjunctivitis.** Bol. del Hosp. Oft. de Nra. Sra. de la Luz, 1946, May-June, pp. 153-168.

Incidentally the author refers to the old treatment of such cases, which consisted of covering the eye with a watch glass and strips of adhesive plaster. He discusses various theories as to causation, and various lines of treatment. He is disposed to regard the condition as chiefly arising from the combined effect of actinic light and hypovitaminosis. Particularly, he records three cases in children of the same family, in whom benefit appeared to be derived from prescribing a diet which supplied vitamins previously absent.

W. H. Crisp.

Araya C., Adrian. **Clinical study of hypovitaminosis A in the nursing mother. Test of conjunctival keratinization.** Arch. Chilenos de Oft., 1946, v. 2, Jan.-Feb., pp. 11-22.

The part played by vitamin A in various bodily functions is reviewed and the effects of its lack are discussed. The material utilized for the present research was obtained from 70 children, by the following technique. By separating the eyelids, the eyeball was exposed to the air for five minutes, at the end of which time the conjunctiva was gently scraped with the edge of a sterilized knife. The scraping was preceded by instillation of a five-percent-cocaine solution. The scraping was spread on a glass slide, stained with aniline oil and gentian violet followed by Lugol's solution, and fixed with absolute alcohol

and acid alcohol. The keratinized cells show intense staining and absence of nuclei. (References.) W. H. Crisp.

Chibber, P. R. **Penicillin in follicular conjunctivitis.** Indian Jour. Ophth., 1946, v. 7, Jan., p. 11.

The author describes a case of follicular conjunctivitis of six months' duration that responded to sulphanilamide penicillin ointment in one week.

Irwin E. Gaynor.

Campbell, M. D. **Conjunctivitis-acute, hemolytic, staphylococcus aureus.** J. Michigan St., Med. Soc., 1946, v. 45, Dec., pp. 1615-1618.

Cultures were taken in 107 patients with this troublesome infection at the Army Air Base in Orlando, Fla.

The organisms present were nonhemolytic and slightly hemolytic staphylococcus albus and nonhemolytic and hemolytic staphylococcus aureus. The coagulose test as suggested by Thygeson was used in differentiating hemolytic staphylococcus aureus from other organisms.

Symptoms and treatment are discussed. In one case of hemolytic staphylococcus aureus infection, complicated by panophthalmitis, evisceration became necessary.

In all cases of hemolytic aureus infection the coagulose test was positive.

Francis M. Crage.

Lauda, E. **Findings and treatment in Reiter's synodrome.** Wien. Klin. Wchnschr., 1946, v. 58, Feb., pp. 55-56.

Reiter's syndrome is characterized by conjunctivitis, polyarthritis, and urethritis. It usually appears within two to four weeks after an attack of gastro-enterocolitis, especially dysentery, and is regarded as an allergic or anaphylactic rheumatic affliction following these intestinal diseases. The author observed a patient who had these symptoms for three months and finally developed meningitis and encephalitis and died. The pathological report on the brain emphasized general hyperemia and perivascular lymphocytic and leucocytic infiltration. There seems no doubt that the intracranial disease has the same allergic or anaphylactic origin as the other manifestations and constitutes a part of the syndrome or a complication of it. Lauda recommends large amounts of salicylates (4 to 8 gm.) in one shock treatment and mentions that, in spite of failures, treatment with salicylates gives the best chance for success. Max Hirschfelder.

Siotto, Giovanni. **Diffuse bilateral plasmoma of the conjunctiva.** Rassegna Ital. d'Ottal., 1941, v. 10, July-Aug., pp. 400-416.

Pascheff in 1908 gave the name of plasmoma to hyperplasias of the conjunctiva which were rich in plasma cells. Such tumors are also found in bone marrow, lymph glands, orbit, and lacrimal sac.

In the eye they are most often found in the upper tarus or superior fornix, and rarely in the lower lid. They are frequently associated with trachoma and develop slowly and are believed to result from prolonged inflammatory irritation. However, pathologists do not agree as to the etiology.

The author describes in detail the clinical and histologic changes in a case of plasmoma that occurred in a 31-year-old woman, who had trachoma. (3 figures). E. M. Blake.

Siotto, G. **Ocular lesions from the venom of eels.** Rassegna Ital. d'Ottal., 1941, v. 10, Nov.-Dec., pp. 594-609.

While cleaning eels some bile spurted

into the eyes of two patients described by Siotto. The symptoms produced were pain, burning sensation, and muco-purulent secretion. There was no corneal involvement. Experimentally, a keratoconjunctivitis was induced in rabbits' eyes. The meagre literature on the subject is reviewed.

Eugene M. Blake.

Sentoro, N. **Tumors of the plica semilunaris.** Rassegna Ital. d'Ottal., 1941, v. 10, Nov.-Dec., pp. 586-593.

Two cases of new growth in the plica are reported. They were endotheliomas and proliferation developed in the vicinity of vessels, especially in one where definite vascular canals were evident. There was no necrosis, hemorrhage, or exudation, and only slight pigment formation was noted in one. (5 figures.)

Eugene M. Blake.

Zertuche, Abelardo. **Contribution to the surgery of pterygium.** Bol. del Hosp. Oft. de Nra. Sra. de la Luz, 1946, May-June, pp. 169-178.

With five illustrations of the various steps in the operation, the author gives a detailed description of the well-known McReynolds procedure, with a few slight modifications. W. H. Crisp.

6

CORNEA AND SCLERA

Blumenfeld, N. I. **Staining of the conjunctiva and cornea,** Vestnik Oft., 1946, v. 25, pt. 3, p. 39.

An intense bilateral yellow stain of the conjunctiva and cornea, with reduction of visual acuity presented a baffling diagnostic problem, until it was discovered that the patient was insufflating powdered acriquinine into the conjunctival sacs, as a home remedy for brucellosis. The stain remained unchanged during a period of observation which extended for seven weeks, during which time visual acuity rose from 0.3 to normal. Ray K. Daily.

Broendstrup, Poul. **Atypical marginal ulcers of the cornea.** Acta Ophth., 1941, v. 19, pt. 2, pp. 163-172.

Three cases of chronic torpid corneal ulcer are reported. The destructive process began at the limbus and the deep ulcers gradually advanced toward the center. The loss of substance and infiltration were greater in the limbal zone. The adjacent episclera and conjunctiva were involved in the process, and the swollen, poorly vascularized, projecting conjunctiva looked like sickly granulation tissue. In two eyes healing was accompanied by a pseudopterygium-like extension of the conjunctiva into the bottom of the ulcers. The third was not healed when this report was made. Ray K. Daily.

Cornet, E. **The surgery of blindness due to anterior segment cicatrization.** Ann. d'Ocul., 1946, v. 179, June, pp. 319-344.

In uncomplicated corneal opacities affecting vision a trephine total thickness keratoplasty is made with a 3 to 6 mm. trephine. Intracorneal sutures are placed into the implant before it is removed from the donor eye. After the transplant is placed in the recipient eye, its intracorneal sutures are fastened nasally and temporally by horizontally placed sutures. A wedge-shaped conjunctival flap based at the limbus above is drawn down over the implant and sutured to the limbus below. Complicating anterior and posterior synechias may be detached and opaque lenses removed before or after the keratoplasty. A limbal or U-shaped corneal flap incision may be used. The

flap is held in place by three vertical intracorneal sutures, one on each side and the third near the lower flap margin. The last is also used to hold the corneal wound open, that is away from the iris and lens, during the removal of synechias, cicatricial membranes, and cataracts. The creation of an epithelized descemetocele for optical purposes may be of service in the absence of blood vessels, when there is minimal cicatricial tissue and intact corneal epithelium. Leaving Descemet's membrane intact, if possible, the trephined disc is removed, and a substratum is formed by Descemet's membrane. A wedge-shaped conjunctival flap may or may not be necessary. This type of operation which the author calls "keratocataphorase" may be performed in the center or periphery of the cornea or even in the sclera. Thirty-five operations on 22 patients are reviewed.

Chas. A. Bahn.

Doucet. **A case of disciform corneal blood staining.** Ann. d'Ocul., 1946, v. 179, April, pp. 224-231.

After injury to the right eye by slingshot, the usual inflammatory symptoms, hyphema and hypertension followed. Twenty days later, a diffuse golden opacity that could easily be confused with a dislocated lens, occupied the entire cornea. One month later the opacity had become disciform. A paracentesis was performed at that time. After six months the inflammatory symptoms had subsided and left complete seclusion of the pupil, iris atrophy, and cataract. (References.)

Chas. A. Bahn.

Hathi, H. J. **Interstitial keratitis.** Indian Jour. Ophth., 1946, v. 7, Jan., pp. 6-9.

The author describes several interesting cases of syphilitic interstitial keratitis. One patient was cured after nine years of continuous antiluetic therapy, a second cleared up after 18 months and only when his wife was treated. The last had congenital lues complicated by tuberculosis of the lungs and knees. Irwin E. Gaynon.

Hermann, C. **Lattice-like dystrophy of the cornea.** Ophthalmologica, 1946, v. 112, Dec., pp. 350-363.

The report concerns a Swiss family of which eleven members belonging to two generations were examined by the author. The clinical picture was typical of lattice-like (reticulate) corneal dystrophy in its different stages. The hereditary transmission was of the dominant mode. A keratoplasty performed on one member (50 years of age) furnished material for pathologic examination. The corneal epithelium was very irregular, thickened in some and reduced to one or two layers in other places. Bowman's membrane was absent. The main pathologic change was the deposition of amorphous or granular, basophilic, and acidophilic masses and concretions in the anterior layers of the stroma. The acidophilic masses were found only within the lamellae, the basophilic ones within and between the lamellae. The author gives an excellent description of the evolution of the disease.

Peter C. Kronfeld.

Just Tiscornia, Benito. **Semiological and physiopathological considerations on a case of retinal angiosclerosis.** Arch. de Oft. de Buenos Aires, 1946, v. 21, Jan.-March, p. 52.

The author presents a case of retinal angiosclerosis with arterial hypertension studied with the neuroarteriolar test of Vidal and Damel, neurocapillary

test of Vidal and Malbrán, blood chemistry, and stereoscopic angioscopy. He concludes that phlebosclerosis predominates over arteriosclerosis, and advises a thorough semiological study of all patients with these modern techniques in order to arrive at a correct diagnosis and rational treatment. (Charts, bibliography.) Plinio Montalván.

Levkojeva, E. F. **Regeneration of the external ocular membranes after injuries. Its clinical and prognostic significance in ocular perforations.** Vestnik Oft., 1946, v. 25, pt. 3, pp. 25-31.

A microscopic examination of 415 enucleated eyes shows that the regenerative process of the sclera and cornea does not take the form of the usual granulation; it has its own picture with characteristic proliferation of typical cellular elements, which morphologically resembles tissue culture in vitro. The dynamics of the process is characterized by great intensity. Under unfavorable conditions it leads to excessive proliferation, with a tendency of the proliferating tissues to penetrate into the inner structures of the eyeball. The eyeball represents a closed chamber similar to that used for cultures in vitro, and the experience of histologists should suggest measures for regulating the growth of these proliferating tissues. With excessive regenerative processes an independent process of fibromatosis takes place that differs morphologically from sympathetic ophthalmia, but clinically simulates traumatic iridocyclitis from which it should be differentiated. (3 photomicrographs.) Ray K. Daily.

Lund, Axel. **A case of interstitial keratitis after phlegmon of the arm.** Acta Ophth., 1941, v. 19, pt. 2, pp. 147-152.

A nurse accidentally pricked her arm with a pin, which was contaminated by vomitus. She developed a phlegmon of the arm, and cultures from the pus showed a growth of proteus bacilli. Six weeks later she developed a conjunctivitis, complicated by mild symptoms of iritis, and an interstitial keratitis with a massive discoid infiltration. The pathogenesis of the ocular disease is discussed, and the author believes that it is analogous to endogenous gonorrheal conjunctivitis. Ray K. Daily.

Lund, Axel. **A family with Groenouws hereditary dystrophy of the cornea.** Acta Ophth., 1941, v. 19, pt. 2, pp. 153-161.

Lund reports a case of the granular type of corneal dystrophy. A chart of the family tree of three generations reveals three affected members in the last two generations. The literature is reviewed. (Genealogical tree.) Ray K. Daily.

Magitot, A. **Pterygium and keratoplasty.** Ann. d'Ocul., 1946, v. 179, June, pp. 346-352.

The following operation for potentially recurrent pterygium is considered superior to buccal mucous membrane implants. With a 5 to 6 mm. trephine, one third of the cutting edge of which has been removed, a semilunar incision is made around the head of the pterygium. The cornea is marked to outline a future implant. The pterygium is excised from the cornea and conjunctiva with a keratome-like knife and scissors. At the site of the previous marking with the trephine an incision is made one half way through the cornea. This semicircular piece of cornea is then excised with a sharp cystotome and keratome. A similar piece of cornea is excised from a donor, or from the same

eye. If the graft is secured from a donor, the eye should have been immediately excised unless kept in hemolyzed serum in temperature of four degrees for not more than four to eight days. A conjunctival flap is dissected from above and below and held in place over the graft by two conjunctival sutures. Chas. A. Bahn.

Pillat, A. **Report on the appearance of keratomalacia in Austrian adults.** Wien. klin. Wchnschr., 1946, v. 58, pp. 557-560.

Xerophthalmia and keratomalacia, which are caused by deficiencies and insufficiencies in nutrition, were almost unknown in Europe, particularly in agricultural Austria. Before World War II there were only three reports concerning the findings of xerophthalmia in Europeans and these concerned inmates of public institutions. During 1945 and 1946 signs of vitamin A deficiency appeared in the population of Vienna. An increasing number of people had nightblindness (60 percent of all the patients admitted to the Eye Clinic). Prexerosis and Bitot's spots were noted in a smaller percentage of patients. Pillat reports four patients with advanced eye findings. He describes the clinical course in two infants whose eyes had large dry ulcers of the cornea and widespread corneal prexerosis. Two adults also had dry central corneal ulcers with reduction of sight to hand movements and finger counting. The author mentions that the lack of food was also responsible for a more serious course of other eye diseases like serpentic ulcers and for a number of post operative infections after intraocular surgery. He prefers pure cod liver oil to vitamin concentrates for treatment.

Max Hirschfelder.

Strakhov, V. P. **Kuhnt's conjunctival flap in corneal perforations.** Vestnik Oft., 1945, v. 24, pt. 3, pp. 19-21.

Strakhov believes that the effectiveness of sulfa drugs in preventing infection eliminates the indication for Kuhnt's conjunctival flap, and that its traditional indications need revision.

Ray K. Daily.

Vrolijk, M. **Corneoscleral cyst.** Acta Ophth., 1941, v. 19, pt. 1, pp. 44-51.

The author adds an eleventh case of congenital epithelial limbal cyst to the literature. The clinical appearance, surgical treatment, and the microscopic appearance of this cyst are described. Theories as to the origin of such cysts are stated. The most probable theory postulates that the cysts originate from vestiges of embryonic veins, which were not completely obliterated, or from capillaries, which missed the connection with the canal of Schlemm.

Louis Daily, Jr.

7

UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Azzolini, Umberto. **Ossification of the choroid and sympathetic neuroretinitis.** Rassegna Ital. d'Ottal., 1941, v. 10, July-Aug., pp. 357-399.

Attention is called to the fact that the term ossification of the choroid is incorrect as the choroid is merely the tissue in which the newformed bone is pathologically developed. At the age of eleven years a girl suffered a penetrating wound of the left eye, which gradually decreased in size and was blind. Eleven years later photophobia and gradually decreasing vision was noted in the right eye. The important change in the sympathizing eye was a neuro-

retinitis, without involvement of the uvea.

An excellent review of the subject of bone formation in various tissues of the eye is given and an extensive bibliography. The author contends that bone develops from an inflammatory exudate which arises from the choroid. (3 figures.) E. M. Blake.

v. Bahr, Gunnar. **The physiologic importance of elimination of aqueous through the cornea.** Acta Ophth., 1941, v. 19, pt. 2, pp. 125-134.

The author reviews the literature and reports his investigations on rabbits. The findings confirm Ridley's results on enucleated eyes, and show that there is a normal loss of fluid through the cornea. The layer of lacrimal fluid, exercises an osmotic effect on the aqueous. Ray K. Daily.

Baltin, M. M. **Roentgenographic study of the drainage of aqueous from the anterior chamber.** Vestnik Oft., 1945, v. 24, pts. 1-2, pp. 14-19.

Thorotrast, used as the contrast material, was injected into the anterior chamber of rabbits. The findings on 40 animals show that the thorotrast is gradually absorbed; it passes from the angle of the anterior chamber into the suprachoroidal space and simultaneously invades the stroma of the iris. Not once, in the 40 experimental animals, was it found to enter Schlemm's canal. Histologic examination of the enucleated eyes confirmed the roentgenoscopic findings. The particles of the contrast substance are carried away by the histiocytes which pass into the suprachoroidal space, and from there probably through the emissaries into Tenon's capsule. The histologic picture demonstrates also the part which the iris plays in the elimination of colloids from the anterior chamber. It is possible that the route taken by the particles of thorotrast is not the physiologic pathway of drainage since the injection of foreign substances into the anterior chamber creates abnormal conditions. The literature is reviewed.

Ray K. Daily.

Barany, E. **Role of ultra-filtration in the formation of aqueous humor.** Nature, 1946, v. 158, Nov. 9, p. 665.

The present work was undertaken to test the alternative (2) that the amount of sodium entering the aqueous by secretion greatly exceeds the amount entering by ultrafiltration, even if ultrafiltration still supplies a considerable part of the fluid volume of the aqueous.

If the secretion is to supply almost all the sodium and the ultrafiltrate a considerable part of all the fluid, their respective sodium contents obviously must be markedly different. But as sodium is the absolutely dominant cation of the aqueous, a marked difference in osmotic pressure would necessarily accompany any large difference in sodium content. If alternative (2) were true, then the secretion would have a higher osmotic pressure than the ultrafiltrate. The aqueous, being a mixture of the two, would have an intermediate osmotic pressure, and this would depend on the proportions of the mixture. Thus, by reducing the amount of ultrafiltrate, one could change the osmotic pressure of the aqueous towards that of the secretion and, as the secretion is hypertonic, towards higher values of osmotic pressure.

The amount of ultrafiltrate (if any) in the aqueous of one eye was reduced by clamping the homolateral common carotid artery in rabbits. This greatly reduced the filtering pressure and there-

by the rate of ultrafiltration. The osmotic pressure difference between the two aqueous humors was determined by the Hill-Baldes thermo-electric method 1½ to 2 hours after carotid closure. The mean difference between the side with closed carotid and the control side was $-0.5 + 1.1$ mgm. sodium chloride per 100 ML (29 experiments on 22 animals, 3 to 9 determinations of osmotic pressure on each sample). Thus, the blood pressure reduction cannot have augmented the osmotic pressure by more than at most $-0.5 + 3 \times 1.0 = 2.8$ mgm. sodium chloride per 100 ML. This change is so small that ultrafiltration cannot play any considerable part in the formation of aqueous humor.

Theodore M. Shapira.

Costi, C., and Marñón, G. **Uveoparotid fever (Heerfordt's syndrome).** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, Dec., pp. 1122-1129. (See Section 17, Systemic diseases and parasites.)

Godtfredsen, Erik. **Chronic iridocyclitis with neurologic symptoms.** Acta Ophth., 1945, v. 27, pt. 1, pp. 75-87.

The material for this first systematic investigation into the simultaneous involvement of the uveal tract and the central nervous system comprises 451 cases of chronic iridocyclitis, nine of which had neurologic symptoms caused chiefly by a transitory arachnoiditis in the posterior cranial fossa. Among the 451 patients 26 had benign lymphogranulomatosis; nine probably did, and the etiology in the others was presumably tuberculosis. Of the nine cases with neurologic symptoms five were diagnosed as benign lymphogranulomatosis, in two the disease was suspected, and two were tuberculous. It is thus seen that iridocyclitis of benign lymphogranulomatosis presents neurologic symptoms 20 to 40 times more frequently than other forms of iridocyclitis. In all nine the iridocyclitis was bilateral, severe, and lasted from six months to five years. The neurologic symptoms were polymorphous. Unlike the symptoms of the iridocyclitis most of the neurologic symptoms were transitory, except in the patients with tuberculosis, who died, one of meningitis, and the other after a fall due to his cerebral lesion. Two of the nine patients presented Heerfordt's syndrome. The prognosis for the patient with iridocyclitis associated with neurologic symptoms is poor if the etiology is tuberculosis, but is much more favorable if the cause is benign lymphogranulomatosis. (1 table.) Louis Daily, Jr.

Goldmann, H. **Further note on the outflow of aqueous in man.** Ophthalmologica, 1946, v. 112, Dec., pp. 344-349.

Independently of Ascher (Amer. Jour. Ophth., 1942, v. 25, pp. 1174-1209) Goldmann discovered and reported (Ophthalmologica, 1946, v. 111, pp. 146) conjunctival or subconjunctival vessels with clear colorless "cores" and red rims. Upon resumption of communications between Switzerland and the U.S.A. it became clear that these blood vessels were identical with Ascher's aqueous veins. In a number of indirect ways, Ascher has shown that the clear colorless contents of these vessels are in all probability aqueous. Goldmann offers two direct means of proving that the aqueous veins serve as outlets for aqueous. The colorless fluid within these veins can only be plasma or aqueous. Upon intravenous injection of a dye that penetrates poorly into the aqueous, the aqueous vein should re-

main colorless if it contains aqueous, and become stained if it contains plasma. Goldmann has used fluoresceine intravenously or by mouth in a number of patients with clearly visible aqueous veins and found that their clear portions remained clear while all conjunctival blood vessels showed greenish-yellow haloes. Another way of demonstrating the function of the aqueous veins has been to inject dilute India ink into the anterior chamber of a human eye with malignant melanoma immediately before the enucleation. A few minutes later the formerly clear portion of an aqueous vein was found to be occupied by stagnant dark fluid while all other conjunctival vessels had retained their normal color. Then there can be no doubt that the clear contents of aqueous veins consist of aqueous.

Peter C. Kronfeld.

Jona, S. **Angio-sarcoma of the choroid.** Rassegna Ital. d'Ottal., 1914, v. 10, Nov.-Dec., pp. 557-575.

The author discusses the various hypotheses presented as to the histogenesis of tumors of the choroid and describes three cases of leukosarcoma. (4 figures.)

Eugene M. Blake.

Katzenellenbogen, I. **Recurrent aphthous ulceration of oral mucous membrane and genitals associated with recurrent hypopyon iritis (Behcet's syndrome). Report of three cases.** Brit. J. Derm. and Syph., 1946, v. 58, July-Aug., pp. 161-172.

Behcet's syndrome consists of aphthous ulceration on the oral mucosa, particularly that of the lower lip, sharp edged ulcers of the scrotum and root of the penis, and hypopyon iritis with hemorrhages in the vitreous and retina. The lesions are recurrent. Two of the patients also suffered from recurrent erythema nodosum and epididymitis. There is a gradual loss of vision from recurrent hemorrhage. All the patients have a peculiar skin reaction in that wounds from the hypodermic needle are followed by erythema and pustule formation. Smallpox vaccine seems to be the best treatment.

Irwin E. Gaynon.

Loewenstein, A., and Foster, J. **Malignant melanoma of limbus and spontaneous cyst of pigmented layer of iris in same sector.** Arch. of Ophth., 1947, v. 37, Jan., pp. 8-17.

A malignant episcleral melanoma, a spontaneous cyst of the posterior tissue of the iris, and a heavy deposit of pigment in the meshwork behind Schlemm's canal were observed in the same sector of the eye of a woman, 33 years of age, who also had bilateral congenital cataract.

It is suggested that fetal inflammation simultaneously produced the cyst, by preventing complete closure of the cleft between the two layers of the optic vesicle, and the melanoma, by displacement of the pigment-storing cells of the outer germinal layer. The congenital cataract and the heavy pigmentation of the meshwork behind Schlemm's canal probably originated in the same inflammatory process.

R. W. Danielson.

O'Reilly. **Massive choroidal hemorrhage.** Arch. Chilenos de Oft., 1946, v. 2, Jan.-Feb., pp. 23-26.

A patient aged 15 years had an extremely violent pain in the right eye, increasing for five days, with marked redness and complete loss of vision in this eye. Examination showed edema of the lids and of the surrounding adnexa, some exophthalmos with retention of movements, clouding of the cornea, and

moderate shallowness of the anterior chamber. The iris was edematous, the pupil dilated ad maximum, intraocular tension plus three. The preliminary diagnosis was of retinal glioma. The enucleated eye showed massive choroidal hemorrhage with infiltration into the vitreous and retinal detachment. The condition is extremely rare. (2 illustrations.) W. H. Crisp.

Rubino, A. **The uveal-meningitic syndrome.** Riv. Oto-Neuro-Oft., 1946, v. 21, March-April, pp. 73-84.

Five cases of this syndrome are reported. Three of the patients were male and their ages ranged between 7 and 64 years. The syndrome consists of a bilateral, acute, exudative choroiditis, or iritis and irido-cyclitis, accompanied by neurologic and general disturbances. The disease starts suddenly, usually with high temperature, headaches, vomiting, delirium, and disturbances of sight which may lead rapidly to blindness. Blepharospasm with intense photophobia and lacrimation are usual symptoms. Conjunctival and pericorneal injections, and a turbid vitreous with intense papillitis and peripapillitis are always found, and some eyes have synechias. The disease lasted from one to three months and showed marked improvement after spinal punctures. Like Harada's and Vogt-Koyanagi's diseases this syndrome is obscure in etiology and pathogenesis. The association of uveal and meningeal symptoms suggests the importance of an embryonic, morphologic, and functional analogy between the uveal membrane and the leptomeninges.

Melchiore Lombardo.

Sánchez H., J. R. **Dental focal infection.** Bol. del Hosp. Oft. de Nra. Sra. de la Luz, 1946, May-June, pp. 179-184.

The author reports four cases, respectively of recurrent iritis, recurrent hyalitis, episcleritis, and uveitis, all apparently attributed to dental infection, but in none of which the result of attention to the diseased teeth is stated.

W. H. Crisp.

Sathaye, V. D. **Iridectomy under a conjunctival flap.** Indian Jour. Ophth., 1946, v. 7, April, pp. 25-27.

After preliminary anesthesia, and bridle suture, the author makes a conjunctival flap, and an incision into the sclera just above the limbus from 11 to 1 o'clock which is gradually deepened until the anterior chamber is reached. The iris is then grasped by forceps and excised. Irwin E. Gaynon.

Scullica, F. **The pathologic vascularizations of the anterior surface of the iris.** Ann. di Ottal., 1946, v. 73, Feb., pp. 65-90; March, pp. 129-166.

From a mass of clinical and histological observations differential criteria are established for the recognition of three types of pathological vascularization of the iris.

In absolute glaucoma the site of predilection is the ciliary zone of the iris, and the vessels rarely extend further inward than the collarette; only in an advanced stage may a small branch here and there reach the pupillary zone. The vessels for the most part are narrow and their course tends to be parallel to the ciliary margin. Lying at different levels in the stroma they may emerge at any point and then, after a more or less undulatory course on the surface of the iris, reënter the stroma, without diminution of caliber. Sometimes they form a broad festoon with both its ends at the ciliary margin. Their branches, if any, are almost always terminal, but usually they do not

give off collaterals or form networks. Occasionally they may have radial branches extending to the collarette where they may bifurcate.

In iridocyclitis the vessels for the most part have a radial course and are quite stout and tortuous, with frequent subdivisions and anastomoses. They usually originate at the periphery and tend to form networks of increasing compactness as they approach the pupillary margin. The sphincteric zone is always involved, and vessels may extend into the pupillary area with the formation of new connective tissue. Recognition of this type is facilitated by the presence of synechiae or a pupillary membrane or by the behavior of the uveal pigment.

In rubeosis the vascularization differs appreciably from that found in the other two types. Its site is by preference in the sphincteric zone; less commonly, in proximity to the ciliary margin. The vessels may be so small as to escape detection unless the slit-lamp is used; they typically take the form of fine networks or clusters, either isolated or connected by slender branches. One or two larger vessels, rarely as many as four, may extend outward in a radial direction. Partial ectropion of the uvea may also be present.

All three types are associated with glaucoma. In absolute glaucoma and typically in rubeosis the glaucomatous state precedes the vascularization, whereas the reverse is true in iridocyclitis.

In all three types, though less so in rubeosis, the anterior chamber is abnormally deep. (In most cases of absolute glaucoma there is no vascularization and the anterior chamber is not deep.) It is posible that the cause of the increased depth is to be found in the marked venous statis and consequent transudation.

In all three tppes the action of miotics is prejudicial. Mydriatics act beneficially by combating the venous stasis in the iris. Harry K. Messenger.

Sironi, L. **Frequency of tuberculosis of the eye and its treatment with tuberculin.** Rassegna Ital. d'Ottal., 1942, v. 11, Jan.-Feb., p. 37.

Sironi gives an excellent survey of the opinions of various authors as to the frequency of tuberculosis as the cause of ocular disease. For instance, tuberculosis is believed to be the cause of all choroiditis by Courfein and of 20 percent of it by Uhtoff. Twenty cases of fundus disease are reported in detail, including exudative choroiditis, conglomerate tubercle, retinal hemorrhage, neuroretinitis, and periphlebitis. The skin reactions, vision, recurrence after treatment with tuberculin, and dosage of tuberculin are discussed. Five beautiful colored plates are included.

Eugene M. Blake.

Stocker, F. W. **Experimental studies on the blood-aqueous barrier.** Arch. of Ophth., 1946, v. 36, Nov., pp. 612-616.

In order to understand better the abnormal variations of the intraocular pressure, one should know as much as possible about the normal mechanism of the exchange of fluid between the blood and the eye, the rate of inflow of the fluid and how this rate may be changed under various conditions. Several attempts have been made to supply the blood with a tracer substance, the presence of which could be demonstrated in the aqueous after passage through the blood-aqueous barrier. The fluorescein test is a useful method for studying the production and circu-

lation of the aqueous. but there is no accurate way of recording the concentration of fluorescein in the aqueous. Other substances have been used as tracers such as heavy water, and radioactive isotopes of sodium chloride and phosphorus.

A new method of recording fluorescence of the aqueous after intravenous injection of sodium fluorescein, using the Colman photofluorometer, is described. It is demonstrated that the diffusion of fluorescein from the blood into the aqueous of rabbits takes a fairly regular course between three and ten minutes after the injection, after which time it becomes irregularly increased. Further work is to be published soon.

R. W. Danielson.

Tucker, H. A. **Penicillin treatment of acute syphilitic nephrosis and iritis. Report of a case.** Am. J. Med. Sc., 1946, v. 211, June, pp. 718-722.

A colored woman, 29 years of age, had dimness of vision due to an inflamed, painful right eye, of two weeks duration. After diagnosis had been made of secondary syphilis with nephrosis and acute iritis, the patient was given 600,000 Oxford units of sodium penicillin in 7½ days, which caused immediate and sustained improvement of the eye and of the renal lesion. The syphilitic infection itself was apparently cured 708 days after initiation of treatment. (2 figures, references.)

Bennett W. Muir.

Verhage, J. W. C. **Juxtapapillary chorioretinitis (Jensen).** Ophthalmologica, 1946, v. 111, June, pp. 351-358.

The author quotes Jensen's original description of the chorioretinitis which bears his name as well as van der Hoeve's theory concerning the pathology of this disease.

A detailed case history is added. A man, 27 years of age, had typical chorioretinitis in his right eye with a striking lesion of a vein and many cholesterin deposits in the fundus. The apparently healthy left eye showed two old periphlebitic patches. The internal examination was negative, except for an increase in the blood cholesterol and an abnormal relationship betwen the free cholesterol and its esters.

The author believes that tuberculosis is the cause of juvenile retinal periphlebitis as well as of Jensen's chorioretinitis. Both diseases affect young, apparently healthy persons. (3 figures, references.)

Alice R. Deutsch.

Verrey, Florian. **The practical importance of intraocular phagocytosis.** Ophthalmologica, 1946, v. 111, April-May, pp. 222-228.

A systematic study of the cytology of the aqueous is recommended by the author. An exact knowledge of the cell content facilitates adequate chemical and vaccine treatment and provides the means to enhance the intraocular phagocytosis by appropriate measures. Microphages in the aqueous were found 96 times in 500 smears. An extraocular focus of infection, sometimes in combination with tuberculosis or syphilis was found in half of the cases. Three clinical histories are recorded as illustrations. (2 tables, 8 figures, references.) Alice R. Deutsch.

Vidal, F., and Damel, C. S. **The ocular neurovegetative system: blue eyes and brown eyes.** Arch. de Oft. de Buenos Aires, 1943, v. 18, Nov., p. 593.

The authors investigated the myd-

riatic action of sympathomimetic drugs instilled in the eyes of 200 individuals of different sex and age. This investigation showed that mydriasis was greater in light colored eyes, even when the drug was used in weak concentration. The blue irides showed the maximal pupillary dilatation, with green, greenish-brown and brown following in decreasing degree of dilatation. The action of sympathomimetic drugs is very slight in dark brown eyes. In heterochromia the dilatation is very marked in the lighter colored eye. When neurovegetative dystonia is present the mydriatic action of the drug is evident, regardless of the color of the iris. Plinio Montalván.

Woods, Alan C. **The influence of hypersensitivity on endogenous uveal disease.** Amer. Jour. Ophth., 1947, v. 30, March, pp. 257-274. (References.)

8

GLAUCOMA AND OCULAR TENSION

Amat, M. M. **The mechanism of action of antiglaucomatous operations.** Arch. de la Soc. Oft. Hisp.-Amer., 1946, v. 6, Jan., pp. 69-81.

An exhaustive review of the literature and brief consideration of several of the author's clinical experiences lead him to the conclusion that all antiglaucomatous operations have a common mode of action; namely, they act directly on the ciliary body by modifying its innervation or vascularization, and indirectly on the eyeball. A new relation is thus established between the secretion and circulation of the intraocular fluids. The operations are actually arteriectomies and sympathectomies. Ray K. Daily.

Barrio, A. **The pathogenesis and medical therapy of acute inflammatory glaucoma.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, Aug., pp. 676-692.

After an exhaustive review of the literature the author concludes that glaucoma is a symptom complex, the outstanding feature of which is the increased ocular tension, and the causes of which may be many, just as the causes of edema may be many. Barrio agrees with Terson that glaucoma is a localized edema. Diagnosis should be directed towards discovering the cause of the increased vascular permeability, be it a vegetative neurosis, an endocrine disturbance, intoxication, infection, allergy, or local or general vascular disease. The early stages of hypertension are practically always due to an increased capillary permeability, and it is only during this period that medical therapy can be effective. Diminution of the capillary permeability can be attained by etiologic treatment and by drugs that act directly on the vessels, such as iron oxide and calcium. Salicylates, antipyrin, and pyramidon also have been found to reduce capillary permeability. The effectiveness of the administration of antihistaminic agents, such as the biologic amines, and of histamine desensitization are being investigated. Ray K. Daily.

Bolgov, P. J. **Chiazzaro operation in glaucoma.** Vestnik Oft., 1945, v. 24, pts. 1-2, pp. 77-83.

This is a detailed report of the implantation of magnesium into the anterior chamber in 39 eyes with glaucoma, which was absolute in all but ten. A conjunctival flap was made as in Elliott's trephine operation, a linear incision was made at the limbus, and a strip of metallic magnesium 2 by 4 mm. was partly introduced into the anterior chamber so that one third of it remained under the conjunctiva. Two

eyes developed late infections and were enucleated. The tabulated data show the effectiveness of the operation and Bolgov advocates its inclusion in the list of antiglaucomatous operations. (5 tables.) Ray K. Daily.

Busacca, A. **What have we learned about gonioscopy?** Ann. d'Ocul., 1946, v. 179, Aug., pp. 415-432.

After a historical and anatomical review the author states that gonioscopic synechias are not the expression of a specific pathologic process, but are evidences of different inflammatory processes which are first visible around the iridocorneal sinus. In uveitis with ocular hypertension the author has not observed any pathognomonic sign. Blood vessels do not normally exist in the region of the iridocorneal sinus though in severe uveitis a form of posterior pannus may be seen. After a very detailed study of 25 glaucoma patients and a less detailed gonioscopic study of many more, the author is convinced that there is in the iridocorneal sinus of the glaucomatous no sign characteristic and pathognomonic of glaucoma. The classification of glaucoma into wide and narrow angle types is of little practical value because although the scleral wall of the mouth of the irido-corneal sinus is fixed, the ciliary and iris walls are mobile and with their movements they modify the position of the angle and depth of the iridocorneal sinus. Sclerosis of the trabeculae is not visible gonioscopically. Salzmann showed in 1915 that mydriatics do not close the iridocorneal sinus but, on the contrary, facilitate its examination. Atropine and other cycloplegics do not cause mechanical blockage by pressing the iris against the wall of the irido-corneal sinus. Experimentally, eserine narrows the iridocorneal sinus which is widened by atropine. Gonioscopy does demonstrate, however, that the iridocorneal sinus and the Canal of Schlemm play a very insignificant part in the production of glaucoma. (20 figures.)

Chas. A. Bahn.

Carreras Matas, B. **Diagnosis of glaucoma.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, Dec., pp. 1093-1096.

There are three important signs of glaucoma, ocular hypertension, atrophy with excavation of the disk, and alteration the field of vision. Sometimes simple glaucoma is suspected but one should never dare to make a diagnosis unless one of the cardinal symptoms is present. J. Wesley McKinney.

Casero, L. **The association of nevus flammeus, glaucoma and Weber's syndrome.** Arch. de la Soc. Oft. Hisp.-Amer., 1946, v. 6, April, pp. 370-383.

A nine-year-old girl had a nevus flammeus in the region of the distribution of the first branch of the trigeminal nerve on the left side. The intraocular pressure was 60 mm. of Hg in the left eye. It was reduced to 45 mm. by pilocarpine, and maintained at that level for one year. She had an excavation of the optic disc, normal peripheral fields, and a central scotoma. Neurologic examination revealed a reduction in auditory acuity, bilateral disturbances in the pyramidal tracts, a left hemiparesis, and slight mental retardation. Radiography demonstrated a dilatation of the diploeic venous sinuses of the left frontal region, and small califications above the alae of the sphenoid. The literature is briefly reviewed.

Ray K. Daily.

Dalsgaard-Nielsen, Esther. **Buphthalmia. (A survey of buphthalmic patients admitted to the eye clinic of the**

Rigshospital in the period of 1910-1943.) Acta Ophth., 1945, v. 23, pt. 1, pp. 49-74.

The 49 patients found in this survey comprise 0.32 percent of the eye patients. In 35 percent the disease was unilateral. In 44 percent the diagnosis was made at birth, and in 38 percent within the first six months of life. One half of the patients were treated in their first year, and 20 percent under the age of three years. The material includes two families in which the disease was hereditary. The corneal diameter of the affected eyes ranged from 10.5 to 17 mm., with an average of 13.6 mm. Intraocular tension varied from 28 to 101 mm. Hg. and usually was between 40 and 70. Seven eyes were treated with pilocarpine. Seventy-four eyes were operated upon from one to six times, a total of 137 operations. The operation most commonly employed was Elliott's trepanation. Postoperative improvement was noted in 83 percent of the surgical patients. For 32 patients the period of observation ranged from 1 to 25 years. Many were observed for 10 years, and data on vision were available for 47 eyes. Of these 6 were enucleated, and 10 were blind; 10 eyes had less than 5/60 vision, 7 less than 6/24, and 8 had a visual acuity between 6/18 and 6/6. The value of early operation is evident from the fact that most of the patients with good vision were among those on whom the operation was performed within the first year of life. (9 tables.) Louis Daily, Jr.

Dominguez, D. D., and Lucena, M. de T. **Glaucoma and the vegetative system.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, Oct., pp. 865-870.

The data of the authors' investigations of the general state of the autonomic nervous system in glaucoma show that 65 percent of patients with inflammatory glaucoma are amphotonics, and that patients with simple glaucoma suffer from dystonias of a mixed type. The local autonomic innervation was dystonic and with a constant increase in sympathetic excitability. As long as glaucoma remains in the phase of neurosis general medical therapy may regulate the general and local vegetative tone with arrest of the disease. The diagnosis must be made early, before local organic changes develop. Ray K. Daily.

Duran, C. B. **Can glaucoma be an occasional cause of death?** Arch. de la Soc. Oft. Hisp.-Amer., 1946, v. 6, Jan., pp. 21-25.

Two cases are reported, in which glaucoma is considered the cause of death. The first occurred in a hypertensive, plethoric woman, who came for an eye consultation immediately after a heavy meal. After a diagnosis of preglaucoma she became excited, and developed an acute attack of glaucoma with severe headache and vomiting, which was followed in a few minutes by fatal apoplexy.

The second patient bled to death after a few days of uncontrollable hemorrhage that followed the enucleation of a hard, staphylomatous blind eye. Ray K. Daily.

Epstein, E. **Report on a case of hydrophthalmia (Buphthalmos).** Brit. Jour. Ophth., 1946, v. 30, Aug., pp. 476-478.

A soldier, 24 years of age, served through five years of battles without ocular symptoms. When he complained of headache his vision was found to be 6/60 and 6/18, corrected to 6/36 and 6/9. Shortly thereafter he developed absolute glaucoma in the right eye.

Both corneas were large; the corneal diameters were 14 and 13.5 mm., and the radius of curvature was 7.5 and 7.0 mm. in the right and left eye respectively. It was assumed that the megalocornea was an example of arrested hydrophthalmia which had suddenly become "decompensated."

Morris Kaplan.

Fialho (Sylvio), Abreu. **Heredity in glaucoma.** Rev. Brasileira de Oft., 1946, v. 5, Sept., pp. 17-25.

The author cites two family histories, the former of which is thought to illustrate the rule of anticipation laid down by Albrecht Graefe, according to whom familial glaucoma appears with increasing precocity in successive generations of the same family. The second family tree recorded by Fialho shows glaucoma in three successive generations and, in a prodromal stage, in at least two members of the fourth generation. (2 genealogical trees, references.)

W. H. Crisp.

Fritz, M. H., and Kesert, Meyer. **Glaucoma following ingestion of sulfathiazole.** Amer. Jour. Ophth., 1947, v. 30, Feb., pp. 197-198.

Gradle, H. S., and Sugar, H. S. **Glaucoma capsulare.** Amer. Jour. Ophth., 1947, v. 30, Jan., pp. 12-19. (1 table, references.)

Grigorieva, H. I. **Experimental cyclodialysis on rabbits, with Heine and Zalman's technic.** Vestnik Oft., 1945, v. 24, pts. 1-2, pp. 70-73.

The right eyes of six rabbits were operated upon by Zalman's technic and the left by Heine's. At various intervals after the operation a dye was injected into the anterior chamber, and shortly afterward the eyeballs were enucleated and examined microscopically. The detailed protocols of the eyes reveal that in none of the eyes was the dye found in the suprachoroidal space. Detachment of the ciliary body was found in nine eyes; in one right and in two left eyes the ciliary body was in contact with the sclera. Hemorrhage into the anterior chamber was found in three right eyes and one left. Hemorrhage into the ciliary processes was present in five right and two left eyes; apparently such hemorrhages become absorbed slowly, for they were found in eyes enucleated 20 days after the operation. Perhaps the failure of some of the operations was caused by hemorrhage that blocked the drainage from the anterior chamber. There is no indication that the trephine opening has any significant advantage over the scleral incision, although it is closed by a less dense fibrous tissue than that which unites the scleral incision.

Ray K. Daily.

Hibbeler, H. L. **Personality patterns of white adults with primary glaucoma.** Amer. Jour. Ophth., 1947, v. 30, Feb., pp. 181-186. (2 tables, 4 charts, references.)

Hughes, W. L., and Cole, J. G. **Technical uses of air in ophthalmology.** Trans. Amer. Ophth. Soc., 1945, v. 43, pp. 115-135.

The authors review the uses of air in ophthalmologic radiography and surgery. Surgical experimentation on laboratory animals employing air goniotomy led to the adoption of a surgical technique by which it is possible for them to perform goniotomy in eyes with glaucoma with a shallow anterior chamber as well as those with a wide angle. By simply increasing the amount of air in the anterior chamber its depth

may be increased. They further demonstrated that a very distinct view of the anterior chamber can be obtained by substituting air for the aqueous, which makes a contact glass unnecessary in performing goniotomy. The authors have designed a goniotomy knife with a hollow shaft and an opening near the heel of the blade. By attaching two syringes, a system for withdrawing aqueous and supplanting it with air becomes practical. In three cases of glaucoma such goniotomy was at least temporarily successful.

C. D. F. Jensen.

Ivanov, N. K. **Late results of cyclodialysis in glaucoma.** Vestnik Oft., 1945, v. 24, pts. 1-2, pp. 66-70.

This is an analysis of 100 cases followed from two to eight years. Tension was permanently normalized in 70 percent of chronic inflammatory glaucoma, and in 51 percent of simple glaucoma. Visual acuity remained unchanged in 39 percent of chronic inflammatory glaucoma and in 17 percent of simple. In 26 percent of all cases the eyes became blind, and in 18 percent visual acuity was reduced to light perception because of cataract. Cataract that developed after the operation, particularly with hypotony, was due to a metabolic disturbance in the lens as a consequence of postoperative changes in the ciliary body. Reduction of visual acuity was seen in eyes with normalized tension as a result of progressive cataract or progressive atrophy of the optic nerve. The visual field remained unchanged in 60 percent of cases of chronic inflammatory glaucoma, and in 31 percent of simple glaucoma. The appearance and progression of myopia in emmetropic or hyperopic eyes occurred in 11 percent of cases, and an increased myopia in myopic eyes in 3 percent. (2 tables.) Ray K. Daily.

Jona, Sergio. **The importance of the hypophysis in regulating ocular tonus.** Rassegna Ital. d'Ottal., 1941, v. 1, March-April, p. 151.

The author found a hypofunction of the hypophysis in patients with various kinds of glaucoma. Imre examined 50 pregnant women and found a consistent hypotension, but Baratta could not confirm this. Jona describes the changes in the diameter of the pupil and the intraocular tension of rabbits and normal human beings after the injection of five units of vasopressin, a dose not harmful to man. The effect was studied on eyes under the influence of atropine and of eserine. No change was noted in the retinal arterial pressure or the visual fields. Vasopressin in man has a sympathicomimetic action and does not overcome atropine mydriasis, but in rabbits the effect is parasympathicomimetic and abolishes the mydriasis. In both man and rabbits a hypotension is developed, but is less evident in man. Further studies are needed to determine the actual value of this pituitary extract in the treatment of glaucoma. (10 figures.) E. M. Blake.

Kalfa, S. F. **The management of increased intraocular tension in war injuries.** Vestnik Oft., 1945, v. 24, pts. 1-2, pp. 55-58.

The development of secondary glaucoma following eye injuries is frequently overlooked. For an adherent leucoma the most effective surgical procedure is the double irridectomy proposed by Filatov. Two corneal incisions, made by the puncture and counterpuncture of a Graefe knife, or ab externo, and two iridectomies per-

mit complete separation of the anterior synechia, and restore normal conditions in the anterior chamber angle. Delayed restoration of the anterior chamber if not due to a fistulating wound is treated by a posterior sclerectomy with evacuation of a bead of vitreous. Secondary glaucoma in an aphacic eye is treated by cyclodialysis, through a small trephine opening in the sclera. Rise of ocular tension, caused by uveitis is controlled by alternation of miotics and mydriatics, by osmotherapy, and by retrobulbar injections of novocain. Fuchs's transfixion of the iris is performed for iris bombe, and in cases where this procedure fails it is followed by an iridectomy.

Ray K. Daily.

Kashuk, M. E. **Elastotonometric studies in hypertension.** Oftal. Jour. (Odessa),: 1945, pt. 2, pp. 9-15.

By means of elastotonometry Kalfa demonstrated that ocular tension is regulated by an intraocular vascular reflex. The stimulus to this reflex is variation in the intraocular vascular pressure, which is dependent on the general vascular pressure. Each rise in the general blood pressure leads to the simultaneous rise in the ocular tension, which promptly returns to its original level through the function of the regulating vascular apparatus. In the early stages of hypertension the lability of the blood pressure makes repeated demands on the intraocular vascular reflex which is compelled to compensate for frequent and sharp variations in blood pressure. As a result the sensitivity of this reflex is increased. This can be demonstrated by the method of elastotonometry which consists of measurement of the tension with the tonometer with four different weights. In normal eyes the data when plotted, form a straight curve 10 to 12 mm. high. In hypertensive patients the curve is shorter and broken. Kashuk tabulates the measurements of 60 normal eyes in patients with general hypertension and illustrates the changes in the elastotonometric curve. Data show that the elastotonometric curve in 39.1 percent of these patients was 7.1 mm. shorter than the normal curve and sometimes also broken, and that the average rise of the elastotonometric curve in hypertensive patients is considerably lower than normal. It is believed that the shortening of the curve is due to the increased sensitivity of the local vascular reflex, and it is pointed out that the normal ocular tension of these eyes supports the generally accepted view that there is no relation between high blood pressure and glaucoma.

Ray K. Daily.

Leopold, I., and Comroe, J. **Use of diisopropyl fluorophosphate ("DFP") in treatment of glaucoma.** Arch. of Ophth., 1946, v. 35, July, pp. 1-16.

The authors report in detail their experience and research in the use of this new drug on fifty patients. Koelle had previously determined that it is stable in peanut oil but not in aqueous solutions.

Diisopropyl fluorophosphate ("DFP") is an anticholinesterase agent capable of producing prolonged and marked parasympathomimetic effects in the eye. "DFP" has successfully lowered intraocular tension in glaucomatous eyes in 0.05 or 0.1 percent concentration in a peanut oil vehicle. In the majority of the glaucomatous eyes treated with 0.05 or 0.1 percent oily solutions of "DFP" the intraocular tension was controlled with decidedly

fewer daily instillations than when either 1-percent pilocarpine nitrate and/or 0.25 to 0.5 percent physostigmine salicylate in water was employed. In all glaucomatous eyes successfully treated with pilocarpine or physostigmine "DFP" was also effective and usually maintained the intraocular pressure at a lower level.

No instance of dermatitis or conjunctivitis due to repeated use of "DFP" was encountered in the 78 patients. In 36 of the 78 glaucomatous eyes in which treatment with pilocarpine or physostigmine had previously failed, "DFP" succeeded in maintaining intraocular tension below 30 mm. of mercury.

"DFP" has several untoward and undesirable ocular effects, namely, visual blurring, brow ache and eye ache, spasm of accommodation, and pericorneal injection. Two eyes showed an increase in tension. (References.)

R. W. Danielson.

Levina, L. S. **The mechanism of raised intraocular tension.** Vestnik Oft., 1945, v. 24, pts. 1-2, pp. 19-21.

The objective of this investigation was to determine the state of capillary permeability in glaucoma. In one group of patients Eppinger's test was used which consists of a 30-minute compression of the hand under a pressure of 40 mm. of Hg. Under normal vascular conditions pressure does not cause a flow of plasma into the tissues, until it is raised to 60 to 80 mm. of Hg. The number of erythrocytes in the blood taken before and after the removal of the pressure indicated changes in the blood concentration. Acceleration of the sedimentation rate indicates a loss of albumen from the blood into the tissues and is regarded as a sign of increased capillary permeability. A change in the relation between the solid and liquid elements of the blood before and after compression of the hand also indicates a change in capillary permeability. In a third group of glaucoma patients a cantharides blister was produced, and its albumen content analyzed fractionally and compared with a similar examination of the blood. The tabulated data of these tests lead to the conclusion that glaucoma patients have an increased capillary permeability. The increased capillary permeability leads to a disturbance in the osmotic pressure, handicaps the flow of fluid from the anterior chamber, and leads to increased intraocular pressure. The increased intraocular pressure compresses the ocular veins at their point of exit from the eye and further increases the capillary permeability of the veins. The capillary wall also regulates the exchange of gases. A layer of fluid containing an excess of albumen between the capillaries and the tissues leads to a diminution of oxygen and an accumulation of carbon dioxide. The inadequacy of the oxygen supply probably accounts for the progressive loss of vision in eyes which have been operated on successfully for glaucoma. (2 tables.)

Ray K. Daily.

Lijó Pavía, J. **Provoked double retinal pulse; sign of preglaucoma?** Rev. Oto-Neuro-Oft., 1946, v. 21, May-June, pp. 47-51.

The author presents four patients with a mild increase in intraocular tension (32 to 38 mm. Hg). Using the ophthalmodynamometer to produce pressure on the eyeball, the usual venous pulse became associated with a retinal arterial pulsation. It is not claimed that this phenomenon may be interpreted as diagnostic of preglaucoma. (1 cinematograph.)

Edward Saskin.

Magitot, A. **Lectures on glaucoma.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, Nov., pp. 1000-1013.

This is a digest of four lectures given by Magitot. He emphasized the importance of not confusing hypertension and glaucoma, although to many ophthalmologists these two terms are synonymous. The etiology of glaucoma is discussed, and a critical analysis is made of the symptoms considered typical of glaucoma. Magitot demonstrates that corneal edema and shallowness of the anterior chamber are not direct results of hypertension; that a Bjerrum scotoma is not diagnostic of glaucoma, that in glaucoma it is the minimum separabile and not the minimum visibile that is affected, and that disturbances of color vision and excavation of the optic disc are not dependent upon hypertension. The importance of local vascular disturbances and of the instability of the neuro-vegetative system in the pathogenesis of glaucoma are emphasized. He divides glaucoma into two types; that which appears in hyperirritability of the thalamus; and that which appears in the course of infectious diseases, which lower the psychic and physical resistance. He is logically sceptical of the indications for surgery in glaucoma, and believes that the disease can be controlled by local and general medical and psychic therapy. He also discusses infantile glaucoma and glaucoma without hypertension. Magitot had the opportunity to do a histopathologic examination of an eye with infantile glaucoma in an infant 1½ months of age, who died on the operating table. The examination revealed a buphthalmic eye, with a small lens, and diffuse intraocular and intraorbital vascularitis, similar to that found in syphilis. Like Charlin and Terrien, Magitot considers infantile glaucoma luetic, and describes a patient in whom infantile glaucoma responded to antiluetic therapy. In general Magitot is a proponent of medical rather than surgical therapy of glaucoma and considers the retinal arterial tension the best guide in the choice of therapy. If the ocular tension is moderately high, and the arterial pressure normal or elevated medical therapy is indicated. A low arterial pressure is an indication for surgery.

Ray K. Daily.

Magitot, A. **Puncture of the anterior chamber.** Ann. d'Ocul., 1946, v. 179, March, pp. 159-163.

After paracentesis the initial decrease in ocular tension is followed by a secondary increase, which may be used as a provocative test in doubtful glaucomas. A positive Kahn reaction as well as tests for urotropin may be obtained from the reformed aqueous of persons in whom the same test made from the primary aqueous was negative. The reformed aqueous contains a higher concentration of serum albumins and globulins as well as of antibodies. Temporary improvement has often followed repeated paracentesis in primary optic atrophy and in chorioretinitis. The transient functional improvement was apparently due to retinal vascular hyperemia induced by the sudden reduction of intraocular tension. In some types of keratitis and uveitis repeated drainage of the aqueous may be of signal service especially at the most critical stages. A paracentesis wound ordinarily is covered by epithelial cells in 60 minutes.

Chas. A. Bahn.

Meyer, Otto. **Inflammatory jugular phlebostenosis as the cause of glaucoma exogenicum.** Brit. Jour. Ophth., 1946, v. 30, Nov., pp. 682-688.

Glaucoma exogenicum is a secondary glaucoma with an extraocular cause. This cause was traced by the author to an endophlebitis of the jugular veins. This phlebitis narrows the lumen of the vein and causes a damning back of drainage of the episcleral vessels. Glaucoma results. Chronic septic conditions of the mouth, teeth, and throat are blamed for this venous infection. The treatment of the glaucoma resolves itself into a recalibration of the jugular veins. Morris Kaplan.

Missiroli, Giuseppe. **The behavior of the ocular tension after surgical procedures in the abdomen.** Boll. d'Ocul., 1945, v. 24, April-June, pp. 137-151.

The writer examined the changes in the tension in 59 patients for abdominal surgery. A lowering of tension was noted after severe operations and in patients in bad general condition. The hypotony disappeared when the general condition improved and increased still more in those whose condition became worse. The tension is useful in prognosis. (Bibliography.)

Melchiore Lombardo.

Moreu, Angel. **Surgical indications in glaucoma.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, Oct., pp. 859-865.

The objective of every surgical procedure on glaucomatous eyes is to provide intraocular drainage, and to modify the ocular circulation. The first is achieved without difficulty; the other is difficult to achieve and is the principal cause of surgical failure. The operative indication in the preglaucomatous stage is persistence of irregularities in the tension curve, rapid appearance of fluorescin in the aqueous, aggravation of hemeralopia, persistence of pupillary disturbances, and increasing field defects. The operation of choice at this stage is cyclodialysis, which modifies favorably the iridociliary circulation by eliminating the function of a part of the ciliary body after setting up an aseptic iridocyclitis.

In chronic simple glaucoma the problem is one of inadequacy of intraocular drainage. If the fluorescin and nicotinic acid tests indicate an ineffectiveness of medical therapy, surgery should be resorted to without delay. Progressive loss of central visual acuity, constriction of the visual field, persistence of scotomas, deepening of the papillary excavation, and persistence of raised intraocular pressure are indications for surgery. Gonioscopic examination is of great importance in making the choice of the operation and in selecting the operative site. Vascular sclerosis in the retina and choroid is a contraindication to surgery. Advanced constriction of the visual fields is not as dangerous. Since most of these patients seek advice in an advanced stage of the disease a fistulating operation must be done. Cyclodialysis is effective only in aphacic glaucoma, or as a preliminary to a fistulating operation.

Chronic inflammatory glaucoma calls for a careful determination of the tension curve, the state of the refractive media, and the state of the pupil; if medical therapy does not normalize these processes the patient should be operated upon without delay by a fistulating operation if the inflammatory process subsides, or by an iridectomy ab externo if the congestion persists.

Acute glaucoma should be treated intensively medically, but if the eye does not respond to treatment an iridectomy ab externo should be done within 24 hours. Malignant or hemorrhagic glaucoma reacts unfavorably to surgery, and if it becomes unavoidable Vogt's cyclodiathermy or goniocyclodiather-

my is indicated. The same procedures may be tried in absolute glaucoma, in the hope of avoiding enucleation.

Ray K. Daily.

Moreu, Angel. **Studies of intraocular vascular permeability in the various phases of glaucoma.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, Aug., pp. 636-664.

The author regards vascular permeability as the most important factor in the genesis of glaucoma, and places great reliance on the information obtained from the fluorescin and nicotinic acid tests. He considers these tests imperative in the postoperative follow-up, and warns against neglect of medical therapy and against unjustified reliance on surgical normalization of tension. Medical postoperative therapy should be directed towards the improvement of the intraocular vascular circulation. Normal retinal arterial and venous pressures, with a normal relation to the pressure at the arm are good prognostic signs, whether therapy be medical, or surgical, or combined. Postoperative gonioscopic studies permit the inspection of the ciliary region in the area of the iridectomy or of the cyclodialysis. Edema of the ciliary processes that are more or less covered with a fine exudate and delayed elimination of fluorescin at the angle of the anterior chamber are signs of persistent circulatory stasis. If the circulatory disturbances continue, and venous obstruction develops, the atrophy of the optic nerve will progress, and blindness will result in spite of normal ocular tension.

Ray K. Daily.

Moreu, Angel. **The etiopathogenesis of glaucoma.** Arch. de la Soc. Oft. Hisp.-Amer., 1946, v. 6, Aug., pp. 729-821.

This very exhaustive dissertation consists of a thorough review of the literature and a report of the author's investigations into many phases of the subject. His clinical material consisted of 543 cases, 537 of which occurred in people over fifty years of age. Age apparently is a significant etiologic factor, and it is in advanced age that circulatory disturbances, which Moreu considers the basic cause of glaucoma become frequent. Acute and inflammatory glaucoma is more frequent among women, whereas simple chronic glaucoma is predominant among men. A large percentage of glaucoma patients are hypermetropic. A small eyeball makes circulation more difficult and the metabolism of a hypermetropic eye is slower than that of a normal eye. This is shown by a slightly subnormal visual acuity in spite of a perfect refractive correction, by reduced light sensitivity and delayed adaptation, and by a retarded retinal chronaxia. The author does not believe that astigmatism is a factor of significance. Seasonal or climatic influences are factors only in the sense that they may precipitate acute attacks. Among the author's patients 482 had vascular diseases. An allergic attack in a glaucomatous person may precipitate an acute attack of glaucoma, but allergy does not cause glaucoma.

Pathologic studies indicate that glaucoma is primarily a disease of the uvea. The author found the angle of the anterior chamber open in all eyes with recent glaucoma. Obstruction is an indication of an advanced stage. He was never able to confirm Barkan's findings of sclerosis of the walls of Schlemm's canal, nor of trabecular flakes. No anatomic lesion, either in Schlemm's canal or in the trabeculae, can explain the genesis of glaucoma, and the author is convinced that the abnormality is in

the root of the iris and in the ciliary body. In these tissues there is evidence of circulatory stasis; when the angle of the anterior chamber is found closed, it is closed by uveal tissue. The cornea and sclera play a passive role.

The changes in the iris, are undoubtedly characteristic of glaucomatous disturbances. The parenchyma has a definite tendency to atrophy and to pigmentary changes. The pupillary reactions are slow, and there is a tendency to mydriasis. The ciliary body, observed gonioscopically, is edematous, and in iridectomized patients the edema can be seen to involve the ciliary processes. The choroid shows signs of circulatory disturbances, and with infrared light one can see atrophic areas, not demonstrable with ordinary illumination. The retinal disturbances, such as hemeralopia and visual field restrictions are due to lesions of the choroid. In incipient glaucoma the optic nerve is not involved, and excavation of the optic disc appears only in advanced stages of the disease. Among the experimental studies recorded is the author's attempt to produce hypertension in dogs by hyperglycemia. Hyperglycemia to the extent of producing coma and death did not produce any significant changes in the intraocular tension. It was also impossible to produce ocular hypertension by the intraarterial injection of drugs that raise the blood pressure. The intraocular pressure appears to remain independent of the general blood pressure. To demonstrate the role of Schlemm's canal the author injected india ink into the anterior chambers of dogs; at the end of four or five days the anterior chambers appeared clear; at this period the animal was killed and the eyes enucleated. Grains of india ink were found in the perivenous spaces, in Bleising's spaces, and in the perichoroidal space: the canal of Schemm's and the trabecular spaces were entirely free of the granules, indicating that the dye was not eliminated through these passages. The author believes that Schlemm's canal acts as a protective valve, providing filtration only in cases of increased intraocular pressure. To clarify the role of intracranial pressure in the genesis of intraocular hypertension the author induced intracranial hypotension by drainage of the lateral ventricles. This never led to atrophy of the optic nerve. After high ligature of the carotid artery or the jugular vein optic atrophy developed rapidly, indicating the pathogenic role of a circulatory disturbance. The author concludes that glaucoma develops because an initial neurovegetative dystonia causes a circulatory disturbance in the uveal vessels, as a result of which oscillations in the ocular tension are produced. The result of the persistent circulatory disturbance is a venous stasis that leads to increased capillary permeability and production of albuminous exudates, which block the drainage outlets. Schlemm's canal begins to function as a drainage safety valve and signs of hypertension appear. Nutritional disturbances follow, with inadequate production within the tissues of local vasoregulatory hormones. Further alterations in the intraocular pressure follow, with inadequate nutrition of the optic nerve, and with atrophic excavation. The author emphasizes that hypertension and glaucoma must not be confused. Hypertension must be regarded as one of the symptoms of glaucoma. Glaucoma must be recognized and treated as a primary vascular disturbance, with initial functional ocular changes that are followed by irreversible organic pathologic processes.

Ray K. Daily.

Moreu, Angel. **The value of pupillography in the preglaucomatous state.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, Sept., pp. 743-758.

Moreu's study is made with the Hess and Sander pupilloscopes, and he demonstrates that pupillography can be used to diagnose the functional adequacy of the local sympathetic and parasympathetic innervation. The pupillary reaction has three phases. A primary rapid phase under the influence of the parasympathetic; a second slower phase dependent on a relaxation of the sympathetic, and a third still slower period under the dominance of the sympathetic. Pupillographs taken after the instillation of parasympathetic and sympathicomimetic drugs demonstrate the functional adequacy of the local autonomic fibers. Pupillographic tracings illustrate the various pathologic states of the ocular organo-vegetative apparatus, such as sympathetic hyperirritability, hypoirritability and paralysis and similar states of the parasympathetic. The differential diagnosis of the various pupillary syndromes is described in detail. The author believes that this method affords diagnostic, prognostic, and therapeutic indications, and affords a means of determining the efficacy or failure of therapeutic procedures. (8 graphs.)

Ray K. Daily.

Orzalesi, F. **Postoperative abolition of the anterior chamber—causes, consequences, remedies.** Ann. di Ottal., 1946, v. 73, March, pp. 167-182.

Orzalesi believes that obliteration of the anterior chamber and detachment of the choroid, which frequently occur after Elliot's trephining, are due to an excess of filtration and especially of diffusion beyond the limits of the flap. To prevent excessive diffusion he recommends preparing the flap in such a way as to have it bounded by a cicatricial line which will serve as a watertight barrier. He prefers Elliot's original triangular flap which has its apex 10 to 12 mm. from the limbus, which forms the base. The entire flap is dissected down to the limbus and is fastened by a single suture at the apex simply to keep it from being displaced by movement of the lids during the first few hours after operation. Since the conjunctiva retracts a little there is a narrow band of exposed sclera along the two sides. In the process of healing this becomes bridged by conjunctival epithelium without the interposition of a layer of subconjunctival tissue, and beyond this line the aqueous cannot pass. In this way a filtering cicatrix quickly forms under the flap. If the tension rises unduly in the process of healing he resorts to massage (but only when the anterior chamber has reformed). If the cicatrix becomes blocked, without other complications, he attempts to open it by cautiously freeing the conjunctiva.

Harry K. Messenger.

Parker, A. E. P. **Bilateral detachment of the choroid of unusual duration following corneo-scleral trephine.** Brit. Jour. Ophth., 1946, v. 30, Oct., pp. 595-600.

In a woman, 56 years of age, with bilateral glaucoma simplex corneo-scleral trephining was followed by choroidal detachment in the upper nasal quadrant which persisted for a year before reattachment. A similar detachment in the other eye persisted for six months before recovery. (6 figures.)

Morris Kaplan.

Rønne, Gerhard. **Penicillin treatment of late infection following fistulating**

operations. Ophthalmologica, 1946, v. 111, Jan., pp. 1-7.

Four patients with late infection after a fistulating operation were given penicillin. In all of them the eye was preserved and in only one whose eye had been previously badly damaged did the eye lose its function. Moreover, in this case penicillin was administered intraocularly. In two the penicillin was injected subconjunctivally and was instilled and in one instillation alone was used. The subconjunctival injection of 4000 units of penicillin gives no complications at all. Treatment is very effective, all signs of inflammation disappear almost completely within 24 hours after injection. The author recommends the injection of 5000 units of penicillin subconjunctivally outside the infiltrated conjunctival area and instillations every 15 minutes during the first 24 hours. (References.) F. Nelson.

Scheglova, A. A. **The effect of a fall in barometric pressure on the intraocular tension.** Vestnik Oft., 1945, v. 24, pts. 1-2, pp. 21-28.

This study was made in the pressure chamber. The tabulated data show that lowered barometric pressure does not affect the ocular tension of the normal eye. A height of 2,000 to 3,000 meters does not affect the tension of eyes with compensated glaucoma but may prove dangerous to eyes with uncompensated glaucoma. The oscillations in ocular tension, under the influence of lowered barometric pressure may prove dangerous even to eyes with a tendency to increased intraocular pressure, especially in persons with disturbances in the cardiovascular and neurovegetative systems and in those with vascular hypertension. (3 tables.)

Ray K. Daily.

Schmerl, Ernst. **Significance of action of paredrine on the ocular tension of rabbits.** Amer. Jour. Ophth., 1947, v. 30, Feb., pp. 187-189. (1 table, references.)

Sedan, J. **Disc reimplantation after Elliot sclerectomy with cyclodialysis.** Ann. d'Ocul., 1946, v. 179, Aug., pp. 433-437.

Cyclodialysis is considered the glaucoma operation of choice in uveal disease. An Elliot trephine type of sclerectomy is made about 3 mm. posterior to the limbus. Elschnig's spatula is introduced in the trephine opening, passed through the suprachoroidal space and into the anterior chamber; it is then rotated about 45 degrees and withdrawn. The scleral disc is replaced in its original site and covered with a conjunctival flap. This technique is believed to minimize infection and other complications. Chas. A. Bahn.

Streiff, E. B. **Generalized angiotrophoneurosis and glaucoma.** Ophthalmologica, 1946, v. 3, Feb.-March, pp. 68-73.

A patient was observed in whom a diffuse angiotrophoneurosis was associated with extensive skin lesions and a bilateral glaucoma. A severe imbalance of the neuro-endocrinologic equilibrium was thought to be the origin of both the skin and the eye-changes. (3 figures, references.) Alice Deutsch.

Weekers, L. and R. **Treatment of glaucoma by non-perforating cyclodiathermy.** Bull. Soc. Belge d'Ophth., 1945, no. 81, April 29, pp. 50-63.

After experimental and clinical trial with non-perforating cyclodiathermy, the authors feel that it has a very beneficial hypotensive action in the treatment of glaucoma. The effect is prin-

cipally that of uveal vasodilatation which modifies the aqueous humor and favors its absorption. Later there is a certain degree of atrophy of the ciliary body, which diminishes the production of aqueous and further lowers the ocular tension. In cases of chronic or subacute glaucoma, he has found it possible to lower the ocular tension to physiologic level after one procedure. If necessary, it is possible to augment the hypotensive effect by repeating the procedure after a suitable interval. Acute glaucoma, however, does not respond to this form of treatment. In secondary glaucoma and in chronic simple glaucoma the reduction in tension is less, but the procedure is sufficiently effective. In absolute glaucoma, this procedure most often helps avoid enucleation. A detailed description of the authors' technique is given. An electrode is applied directly to the eyeball seven millimeters from the limbus, without dissecting the conjunctiva. M. R. Cholst.

9

CRYSTALLINE LENS

Arruga, H. **A method to extract secondary cataracts.** Ophthalmologica, 1945, v. 110, Sept.-Oct., p. 224.

In order to extract a secondary membrane in toto a capsule forceps is introduced into the anterior chamber through an incision in the limbus. The forceps is pushed down behind the iris if the pupil is not well dilated. Pressure is applied with the fixation forceps which forces the secondary membrane into the capsule forceps. These are then closed, the membrane is loosened by zigzag movements as in intracapsular extractions and easily extracted. (1 photograph.) F. Nelson.

Arruga, H. **The corneal section and sutures in cataract extraction.** Arch. de la Soc. Oft. Hisp.-Amer., 1946, v. 6, April, pp. 331-338.

Arruga stresses the importance of hypotension and avoidance of pressure with the fixation forceps in making a good corneal section. He is sure that a corneal section need not be made rapidly. He makes the section in the limbus, stops bleeding points with the point of a heated strabismus hook, and introduces three to five sutures through the cornea, sclera and conjunctiva. (Illustration.) Ray K. Daily.

Atkinson, W. S. **Preliminary report of corneal section with long bevel and conjunctival flap for cataract extraction.** Trans. Amer. Ophth. Soc., 1945, v. 43, pp. 97-114.

The author points out the influence of the corneal section on operative and postoperative complications in cataract surgery. In order to prevent a leaky wound with shallow or empty anterior chamber and to decrease the occurrence of postoperative hemorrhage into the anterior chamber he suggests a section with a long bevel, and one placed in avascular corneal tissue. He favors the use of a keratome directed away from the iris and toward the apex of the cornea so that the length of the bevel is increased. Such an incision tends to close more firmly and tightly when the normal intraocular pressure is restored or the intraocular pressure is increased, but he points out that with the long bevel placed forward in the cornea it is essential to tumble the lens. This type of corneal section with conjunctival flap made with keratome and scissors is safe and with it the number of postoperative leaky wounds is reduced. Although hyphema

still occurs, the hemorrhages are smaller and less frequent.

C. D. F. Jensen.

François, J. **The complications of intracapsular cataract extraction.** Ann. d'Ocul., 1946, v. 179, May, pp. 280-295.

An analysis of 415 cataract operations performed during nine years is reported. Intracapsular extraction was attempted in 87 percent of the patients. In 11 percent the capsule was prematurely opened. The principal complications were: vitreous loss, 7.1 percent; striped keratitis, 8.3 percent; hyphaema, 7 percent; vitreous opacities, 5 percent; iridocyclitis, 4 percent; glaucoma, 3.6 percent; retinal detachment and iris prolapse, 3.3 percent; choroidal detachment, 0.6 percent; and wound infection, 0.3 percent. Among the less severe complications encountered were striped keratitis, hyphaema, and choroidal detachment. Those of moderate severity included vitreous loss and opacities, and iridocyclitis. The severe complications were glaucoma, retinal detachment and wound infection. The operative procedure is described in detail.

Chas. A. Bahn.

Gát, L., and Orbán, L. **Acute psychoses after cataract operation.** Ophthalmologica, 1946, v. 112, Dec., pp. 335-343.

Two cases of acute psychosis after cataract operation are analyzed from the psychiatric standpoint. The first patient, 24 hours after an uncomplicated bilateral cataract extraction, suddenly became disoriented and violent with very specific hallucinations relating to a fire in which his barn and all his fine cattle were being destroyed without anybody helping him extinguish the fire. At the top of his voice he gave a vivid and most detailed description of his visual and acoustic hallucinations. He did not comprehend reminders that he had been operated upon, that he was in the hospital, or that he had to be quiet. Under bromides plus paraldehyde he quieted down and recovered within 24 hours, with a complete amnesia regarding the psychosis. When questioned about a fire on his property, he refused to answer. From his wife the information was obtained that one week before the operation his barn had burned down, that he had taken an active part in extinguishing the fire and had, at the time, felt badly about the animals that had been destroyed, but had not mentioned the incident again until the outbreak of the psychosis. In the opinion of the psychiatrist, this suppression of a shocking incident may have made it impossible for the patient to adjust himself to it. Thus a complex developed in his subconscious. Such complexes play an important role in the development of reactive psychoses.

The other patient also became acutely disoriented 24 hours after the operation; the main theme of his "argument" was that he should be permitted to do his work instead of being restrained for which there was no reason. Within 24 hours he recovered, but on psychiatric examination proved to be depressed and worried about his ability to earn a living. Further investigation revealed that he had reason to worry about his financial future. His earning power had been greatly reduced by his diminishing eyesight and a former wife had cheated him out of a piece of property which he wanted to will to his present wife to whom he was deeply attached and grateful. Thus, the main mechanism of these two acute psychoses was a pathologic reaction to actual experiences to which the patient

had not had an opportunity of adjusting himself. Precipitating factors are the strange surroundings and the exclusion of the visual corrective orientation. Peter C. Kronfeld.

García Ochoa, R., and Etschemendigaray, A. **Post-tetany cataract.** Anales Argentinos de Oft., 1946, v. 7, Jan.-Feb.-March, pp. 7-9.

In a 41-year-old woman who had hyperthyroidism for a long time a thyroidectomy of the right lower lobe was performed finally, without complications. On the third postoperative day, acute tetany manifested itself for which calcium was given intravenously. The attacks persisted and required three separate graftings of parathyroid tissue on each side of the trachea. Thirteen months after the first appearance of tetany total cataracts developed in each eye. These cataracts, the authors feel, were definitely associated with the tetany of hypoparathyroidism. For prophylaxis they suggest the use of high doses of calcium, perorally and intravenously, and parathyroid tissue grafts. Edward Saskin.

Koke, M. P. **Ciliary dilation and vitreous recession in cataract extraction.** Amer. Jour. Ophth., 1947, v. 30, March, p. 327. (References.)

Saint-Martin, R. **Errors in cataract practice.** Ann. d'Ocul., 1946, v. 179, April, pp. 232-236.

Reduced ophthalmoscopic illumination and a narrow beam facilitate the examination of lens details. Concurrent glaucoma, diabetic and other systemic diseases of the choroid and retina that increase the risk of operation often are not recognized. Generally speaking, when vision is less than 20/50 in the better eye operation should be done upon the other, unless uveitis from lens hypermaturity has made operation necessary sooner. General diseases which may affect the risks of the operation should be routinely searched for. Infections involving the lids or sinuses may decide the success or failure of cataract operation. Cataracts secondary to uveitis are more easily removed by intracapsular extraction, which, however, is not infrequently followed by atrophy of the eyeball. Undue pressure on the iris and ciliary body is a frequent cause of delayed healing. Akinesia, retrobulbar anesthesia, and paralysis of the superior rectus are essential. Where orbital hemorrhage follows injection, operation is best postponed. Sufficient corneoscleral sutures to keep the wound sealed are advised. Sulfonamides and penicillin are used locally in conjunctival infections. Although premature handling of the eye may cause damage, the surgeon should be thoroughly familiar with the course and progress by the sixth day.

Chas. A. Bahn.

Samuels, Bernard. **Cataract in intraocular tumors.** Trans. Amer. Ophth. Soc., 1945, v. 43, pp. 331-343.

The author presents the microscopic findings of cataract formation in 57 globes, each containing an intraocular tumor. In 34 globes the tumor was a malignant melanoma, in 21 a retinoblastoma, in one an epithelioma of the ciliary body, and in another a sarcoma that invaded the ciliary body. He stresses the fact that the tumor was not in every instance the actual sole cause of the cataract, but often the result of complications that develop in the globe during the growth of the tumor or during its degenerative changes. Of the 57 tumors 26 were in contact with the lens. Seventeen of the melanomas were

necrotic, 12 almost entirely so, and all of the retinoblastomas showed signs of necrosis. Excellent microscopic enlargements of the sectioned globe reveal various pathological details such as: folds in the capsule, proliferation of the subcapsular epithelium, necrosis of the subcapsular epithelium, changes in the lenticular substance, calcification of the lens substance, cystic spaces, and vesicular cell formation. He feels that whenever there is a combination of cataract and glaucoma, and there is the slightest possibility of intraocular tumor, it is advisable to recommend the removal of the globe. He emphasizes the importance of the differentiation in childhood between retinoblastoma and metastatic ophthalmitis. A special cause for diagnostic error in tumors concealed by cataract is failure to obtain a complete history. The earliest sign of disturbance in vision may be a distortion of objects, or an impression of dark waves before the eye, or a sensitiveness to light in a certain quadrant, or even dizziness.

C. D. F. Jensen.

10

RETINA AND VITREOUS

Bertotto, E. V., and Abrebanel, V. **Persistent hyaloid artery.** Anales Argentinos de Oft., 1946, v. 7, Apr-May-June, pp. 48-50.

Two cases of unilateral persistent hyaloid artery are presented. The first patient had a vision of 6/12 in the affected eye, which was also the seat of an old extramacular choroiditis. The second had, in addition to the hyaloid artery, a divergent strabismus, and a central scotoma due to macular choroiditis. (1 illustration.)

Edward Saskin.

Cojazzi, L., and Grandi, G. **Relations between retinal arterial pressure and vestibular stimulation.** Riv. Oto-Neuro-Oft., 1946, v. 21, March-Apr., pp. 85-97.

Researches were undertaken to distinguish in the mechanism of vestibular vegetative manifestations the factors of vestibular stimulation from the extravestibular factors. There was an increase in retinal arterial pressure during vestibular stimulation with heat (Veit's method), during simple backward flexion of the head without direct labyrinthine stimulation, and in rotary stimulation (Barany's method). In rotatory stimulation (Buys-Fisher) in which extravestibular stimulation was excluded the retinal arterial pressure was not modified. This shows that the ampullar stimulation cannot be the origin of retinal vascular phenomenon, The latter appear with other vegetative phenomena when stimulations of extravestibular origin occur. (Bibliography.) Melchiore Lombardo.

Falcone, G. **Cyst in the vitreous and posterior cataract in retinitis pigmentosa.** Indian Med. Gazette, 1946, v. 81, Oct., pp. 417-418.

The author presents a case of primary pigmentary degeneration of the retina associated with posterior polar cataract in both eyes and a freely floating cyst in the vitreous of one of the eyes. The cysts have been found to be developmental anomalies of the hyaloid system and in some they seemed to result from intrauterine fetal disease. The posterior polar cataract and the cyst in this patient were considered to be due to embryonal changes in the hyaloid circulation and not to vitreous changes arising from the retinochoroidal disease. Francis M. Crage.

Hruby, K. **Recent clinical and pathological findings in examinations of the vitreous.** Wien. Klin. Wchnschr., 1946, v. 58, Aug., pp. 461-464.

The posterior parts of the vitreous can be examined with the slitlamp by aid of the contact glass or of an interposed lens developed by the author. This method of examination gives us a more thorough understanding of vitreous pathology. Posterior detachment of the vitreous is a frequent occurrence and is found in axial myopia, in senility, in tapetoretinal degenerations, after contusions and perforations, and in retinal detachment. Clinically, so called "formed" vitreous opacities are a certain sign of posterior vitreous detachment. A total posterior detachment of the vitreous is the most frequent type found in younger individuals who retain the normal vitreous structure, whereas in myopic and senile individuals there usually is a destroyed structure that leads to vitreous collapse. In others there is only a partial posterior detachment and this detachment may occur near the optic disc or above or below. There is no doubt about the existence of a posterior limiting membrane of the vitreous. This assertion is based on the clinical findings, because many pathologic changes formerly thought to be within the vitreous are actually between this limiting membrane and the retina. Formed vitreous opacities, the proliferations of retinitis proliferans, and intraocular cysticercus are examples of this kind. Some perforating foreign bodies do not intrude into the vitreous, but lead only to its indentation and rest between the limiting membrane and the retina. Detachment of the vitreous itself scarcely influences the function of the eye, but in certain cases it is the main contributing factor for retinal detachment. The rapid shifting of the vitreous mass during movements of the eyeball may lead to flaplike tears. This may even happen in cases of partial vitreous detachment. Posterior detachment of the vitreous is always found in cases of primary retinal detachment. It is usually absent in cases of secondary detachment of the retina due to tumors and retinal cysts.

Max Hirschfelder.

Koch, F. **Ophthalmoscopic differentiation of arteriolar sclerosis: hypertensive and atheromatous.** Geriatrics, 1946, v. 1, Nov.-Dec., pp. 438-441.

The most useful classification, from the ophthalmoscopic as well as the systemic clinical point of view, is that proposed by Wagener and Keith. These authors employ a numerical grading system of 1 to 4 describing the intensity and degree of deviations from normal with regard to smooth attenuation of arteriolar caliber, focal or superimposed localized arteriolar constrictions (so-called nicking), arteriolar sclerosis, and presence of exudates and hemorrhages. These numerical gradings correspond to the adjectives mild, moderate, marked and severe. The gradings thus applied aid appreciably in determining the prognosis within each group, and are designated as I, II, III, and IV.

Ophthalmoscopically, patients classified as Group I exhibit smooth and uniform attenuation of arteriolar caliber, with little if any arteriolar sclerosis. Those in Group II uniformly reveal some degree of arteriolar sclerosis, together with narrowing or attenuation of caliber, but also may exhibit focal constrictions. Varying degrees of narrowing and sclerosis will be present in Group III, in association with cotton

necrotic, 12 almost entirely so, and all of the retinoblastomas showed signs of necrosis. Excellent microscopic enlargements of the sectioned globe reveal various pathological details such as: folds in the capsule, proliferation of the subcapsular epithelium, necrosis of the subcapsular epithelium, changes in the lenticular substance, calcification of the lens substance, cystic spaces, and vesicular cell formation. He feels that whenever there is a combination of cataract and glaucoma, and there is the slightest possibility of intraocular tumor, it is advisable to recommend the removal of the globe. He emphasizes the importance of the differentiation in childhood between retinoblastoma and metastatic ophthalmitis. A special cause for diagnostic error in tumors concealed by cataract is failure to obtain a complete history. The earliest sign of disturbance in vision may be a distortion of objects, or an impression of dark waves before the eye, or a sensitiveness to light in a certain quadrant, or even dizziness.

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wool exudates and hypertensive hemorrhages of varying types. In Group IV papilledema will have been added to all the findings observed in the preceding groups.

This classification permits the concept that, while all patients do not run the entire gamut from Group I to Group IV to exitus, the patient may experience relapses or remissions that will permit reclassification with regard to prognosis and life expectancy as well as changes in treatment from time to time. Theodore M. Shapira.

Manlove, F. **Retinal and choroidal arterioles in malignant hypertension: a clinical and pathologic study of 15 cases.** Arch. Inter. Med., 1946, v. 78, Oct., pp. 419-440.

The wall to lumen ratios of the retinal and choroidal arterioles measured in this series are greater than those of the arterioles measured in any other organ studied by this method except the lung. This is in accord with the work of Coats, who stated that the walls of arterioles observed in the eye are thinner than those in any other organ.

The wall to lumen ratios of arterioles are definitely decreased in malignant hypertension.

The most common manifestations of arteriolar lesions seen were medial hypertrophy and intimal proliferation. The choroidal vessels were much more affected than the retinal. Hyalinization of part or all of the arteriolar wall was seen frequently. Acute necrosis was seen occasionally.

No relationship was demonstrated between the arteriolar disease and other retinal lesions.

Theodore M. Shapira.

Reca, A. B. **Unusual posthemorrhagic hole of the macula.** Anales Argentinos de Oft., 1946, v. 7, Jan.-Feb.-March, pp. 10-13.

A woman, 29 years of age, with hypertension and hypertensive changes in the retinal vessels, had a sudden and spontaneous loss of vision in the left eye. Examination revealed a fresh, almost spherical macular hemorrhage. In a little over three weeks the hemorrhage had become absorbed and in its stead was a horizontally oval hole in the macula. There was no papillary change. This condition must be differentiated from a post-traumatic macular pseudocyst which is usually surrounded by pigment. (2 illustrations.)

Edward Saskin.

Redslob, E. **The value of the venous retinal pressure.** Ann. d'Ocul., 1946, v. 179, July, pp. 367-374.

The venous retinal pressure is minimal in diastole and maximal in presystole. The retinal capillaries form a barrier between the arterial and venous pressure mechanisms. In arterial hypertension and hypotension, the retinal venous pressure is not affected. A spontaneous venous pulsation was observed in 75 percent of 180 persons examined ophthalmoscopically by the author. The average retinal venous pressure is slightly less than 24 mm. Hg. The maximal pressure varied from 20 to 35 mm. Hg and the minimal from 9 to 15 mm. Hg. Both venous and arterial pressures can be measured by the Baillart dynamometer or less accurately by pressure on the sclera through the upper lid simultaneously viewing the retinal vessels with the ophthalmoscope. Retinal venous pressure varies with intracranial pressure because the

cerebrospinal fluid in the intervaginal space is in contact with the central retinal vein. Five illustrative cases are presented. These include cases of arterial hypertension, and increased intracranial pressure associated with a brain tumor, arachnoiditis, meningitis, and unilateral exophthalmos. (17 references.) Chas. A. Bahn.

Redslob, E. **Quinine intoxication.** Ann. d'Ocul., 1946, v. 179, April, pp. 218-220.

A 31-year-old woman during the second month of pregnancy used three grams of quinine internally as an abortifacient. Six hours later a bloody mass was expelled from the uterus, but blindness and deafness occurred at the same time. The next day, the discs were pale, the arteries small and the veins normal. There was strong mydriasis and practically no light reaction. The following day a stellar infiltration about the macula was observed in both eyes and fingers could be counted at two feet. Small doses of iodides were administered. Four days later the patient had entirely recovered from ocular symptoms which were believed due to retinal vascular spasm. Among the drugs which also produce simultaneous sight loss and deafness are: male fern, pelleterin, santonin, chenopodium, apiol, aniline, and salicylic acid.

Chas. A. Bahn.

Rosenblum, M. E. **The basic principles of surgery of retinal detachment.** Vestnik Oft., 1945, v. 24, pts. 1-2, pp. 10-12.

Of 1000 retinal detachment operations, by diathermy coagulation performed at the Helmholtz Institute, 54 percent were satisfactory. The first operations for detachment with a macular hole were done by diathermy coagulation, with an orbitotomy to afford access to the macula. At present the operation is performed without an orbitotomy. A temporary tenotomy of the external rectus is done instead.

Ray K. Daily.

Rubino, A. **Tentative surgical treatment of Coats's disease.** Riv. di Oft., 1946, v. 1, May, pp. 285-291.

In three eyes of two patients, diathermy coagulation of the choroid was performed. By transillumination, the area to be treated was outlined on the sclera; mild, prolonged, and deep application of the diathermy current is recommended, transscleral first, and perforating at the end of the operation to allow for escape of the subretinal fluid. Visual field diagrams show some improvement in one of the eyes; slight increase of visual acuity was observed in all of the eyes. The greatest improvement was from perception of hand movements to 2/50. Pigment formation was observed in the treated areas, and for four months, the pathologic process did not progress. K. W. Ascher.

Vidal, Flaminio, and Damel, C. S. **Retinal angiosclerosis and the neuroarteriolar test.** Arch. de Oft. de Buenos Aires, 1946, v. 21, Jan.-March, p. 51.

The authors present the results of the neuroarteriolar test in retinal angiosclerosis. Variation of the intraocular pressure after stimulation of the arteriolar system of the eye with a sympathomimetic drug, such as ephedrine sulphate is observed. In 40 cases of retinal angiosclerosis the test was positive in 12 percent, negative in 75 percent, and inverse in 11.54 percent. The interesting feature in this study is the high percentage of inverse tests in an-

giosclerosis as compared with its absence in normal tension and physiologic hypotension. Plinio Montalván.

11
OPTIC NERVE AND TOXIC AMBLYOPIAS

Carroll, F. D. **Nutritional retrobulbar neuritis.** Amer. Jour. Ophth., 1947, v. 30, Feb., pp. 172-176. (3 figures, references.)

Fetterman, J. L., and Barr, J. H. **Progressive syphilitic optic atrophy benefited by combined penicillin and fever therapy. Report of a case.** Arch. Derm. and Syph., 1946, v. 54, pp. 566-568.

The authors report a case of luetic optic atrophy with total blindness in one eye and progressive diminution in vision in the other eye. There was pallor of the disc in the better eye. The other disc was white. The Wassermann reaction of the spinal fluid was positive. Neurologic examination was negative.

Combined typhoid-malaria fever and penicillin therapy improved the vision in the better eye to almost normal. The blind eye remained unchanged. The patient returned to his work but suffered a recurrence 18 months later. Treatment has been resumed.

Francis M. Crage.

Fridman, S. J. **Some characteristics of ocular involvement in craniostenosis.** Vestnik Oft., 1945, v. 24, pts. 1-2, pp. 38-42.

Three patients had a history of headache and vomiting of many years duration, a fundus picture of old secondary optic atrophy, good visual acuity, and moderate constriction of the visual fields. Roentgenoscopy revealed the presence of a moderate degree of craniostenosis. Ray K. Daily.

Hambreson, L., and Schepens, C. **Tobacco amblyopia.** Ann. d'Ocul., 1946, v. 179, April, pp. 191-217.

The more or less excessive use of alcohol is considered of no practical importance in the development or severity of tobacco amblyopia. The hypersensitiveness of specific parts of the eye and eye brain to the several components of tobacco varies widely in different persons and depends on both genetic and environmental factors. Thus blindness has followed blowing tobacco smoke into an aching tooth cavity, and washing an itching skin with a tobacco lotion. Because of the inferior quality of tobacco and its defective fermentation during the war, tobacco amblyopia increased in France about 1000 percent.

The first symptom of tobacco amblyopia is usually a difficulty in recognizing colors, especially red. Vision is abnormally diminished in very bright light. These symptoms are usually binocular but not equally so. In monocular visual tests the patient more easily recognizes the letter to the nasal side, than the letter actually fixated. The initial lesion is a horizontal coecocentral scotoma and is not pericentral. The peripheral field is usually normal, although occasionally a slight upper temporal constriction is observed. The relative increase of red over blue in scotomas is considered unimportant.

In 47 percent of a large series (the number is not mentioned) pallor and blurring of the temporal disc margin were observed. One third of the patients were less than 55 years of age, 47 percent were between 45 and 55

years, and 20 percent were more than 65 years of age.

Tobacco amblyopia must be considered part of a general intoxication which affects especially the autonomic nervous and cardiovascular systems. Tobacco is basically a vasoconstrictor, a hypertensor, a cardiac accelerator, and a miotic. The constitutional symptoms were greater, and recovery was less rapid in younger patients. Debilitating diseases, diabetes, syphilis, and some infectuous diseases predisposed some individuals to tobacco amblyopia. Nicotine is detoxified in the liver where it is oxidized by glycogenic substances and produces a conjugate glycuronic acid. The basic pathologic lesion is a degeneration of the ganglion cells of the retina and atrophy of nerve fibers following a primary injury of the cones in the papulomacular area. The toxic substances reach the macular region through the retinal and choroidal capillaries which also degenerate. Production and action of the lipoid substance that is akin to vitamin A are interfered with, therefore red perception is reduced.

Complete abstinence from tobacco and maintenance of maximal nutritional activity are essential. The use of pilocarpine is of secondary value. (11 figures, references.)

Chas. A. Bahn.

Levatin, Paul. **Atrophy of the optic nerve following hemorrhage**. Arch. of Ophth., 1947, v. 37, Jan., pp. 18-24.

After briefly reviewing the literature and discussing the theories, the author reports a case. Partial atrophy of the optic nerve developed in one eye in a 34-year-old white man during a massive hemorrhage from a duodenal ulcer and later in the other eye. Repeated determinations of the blood count and the blood pressure during this illness revealed a persistent state of peripheral circulatory failure and such an extreme acute anemia that ischemia is considered the chief etiologic factor in the production of the pathologic changes observed. The ophthalmologic findings suggest that ischemia can cause atrophy of the optic nerve either by producing degeneration of the retinal ganglion cells or by direct destruction of the optic nerve fibers in the region of the lamina cribosa. The former mechanism best explains the slow, delayed onset of partial atrophy of the right optic nerve in this patient, whereas the latter mechanism best explains the rapid, early onset of almost total optic atrophy of the left optic nerve.

R. W. Danielson.

Magnus, J. A. **Bilateral partial coloboma of the optic nerve.** Brit. Jour. Ophth., 1946, v. 30, Nov., pp. 692-696.

Bilateral disc anomalies were seen in a 19-year-old boy. Both discs had rather marked nasal cupping. The tension was normal in each eye and remained so during provocative tests for glaucoma. Field defects exactly corresponded to the defects of the discs. A diagnosis of congenital coloboma of the nerves was made and glaucoma and cavernous atrophy were ruled out. (3 figures.)

Morris Kaplan.

Marthinsen, Reidar. **The supraclinoid carotid aneurysm.** Acta Ophth., 1941, v. 19, pt. 2, pp. 141-146.

A case of a large median supraclinoid aneurysm diagnosed clinically, and verified at operation is reported. The early ocular symptoms consisted of markedly reduced visual acuity, con-

centric contraction of the visual field with a central scotoma, and loss of color vision in the right eye. A year later there was loss of vision and central scotoma in the left eye. Four years later there was still further deterioration of vision, and atrophy of the left optic nerve. Ray K. Daily.

Ravasini, Carlo. **An atypical case of Foster-Kennedy syndrome.** Riv. Oto-Neuro-Oft., 1942, v. 19, March-April, pp. 133-152.

A 60-year-old male patient had migrainelike headaches on his right side for about three years and gradual loss of vision. While the headaches became less marked, the vision of his right eye was soon nil, and that of his left eye 3/10 with increasing constriction of the temporal field of vision. The right disc showed complete atrophy with sharp borders and normal retinal vessels, the left disc was slightly edematous, pale on the temporal side, and of almost normal color on the nasal. Later, the left disc showed a postneuritic atrophy. A meningioma of the right olfactory groove or of the smaller sphenoid wing was diagnosed. (3 X-ray photographs, 2 visual fields.) K. W. Ascher.

Regoli, Attilio. **Meningioma of alveolar type, originating from the sheaths of the orbital part of the optic nerve.** Riv. Oto-Neuro-Oft., 1942, v. 19, May-June, pp. 174-193.

A woman, 42 years of age, noted watering of her left eye. Three years later there was slight protrusion of her left eyeball, lid edema, and a reduction of vision of her left eye to 5/10 without a central scotoma. There was no pain or muscular paresis and X-ray films failed to show pathologic changes in the orbit during the first year after visual loss was noted; later there was a slight shadow in the left orbit. Seven years later, when the exophthalmos reached 12 mm., and the optic disc was pale and its borders hazy the left orbit had a definite shadow in the X-ray picture. A hard, nonfluctuating mass was felt through the upper lid, and was removed under local anesthesia. The tumor was adherent to the posterior part of the optic nerve, measured 4 by 2.5 cm., and proved, on histologic examination, to be an extradural meningioma of alveolar type. Discussion of the differential diagnosis, pathogenesis, and literature follows; 73 meningiomas of the optic nerve were found in the literature among 399 cases of optic nerve tumor. (4 photomicrographs.) K. W. Ascher.

Rønne, Henning. **The cytoplasmic inheritance in Leber's disease.** Acta Ophth., 1945, v. 23, pt. 1, pp. 89-93.

The author replies to Lundsgaard's comment on his criticism of her theory of the inheritance of Leber's disease. He finds support for his contention that the disease is transmitted through the cytoplasm of the ovum in an analysis of Lundsgaard's familial series, which shows that 93 percent (plus or minus 5 percent) of the females are carriers of the disease. This does not disagree with twice the standard deviation from the 100 percent inheritance which one would expect. He attributes the absence of inheritance through affected males to the infinitesimal quantity of cytoplasm in the spermatozoa. (1 table.) Louis Daily, Jr.

Roberts, W. L., and Willcockson, T. H. **Postneuritic optic atrophy in repatriated prisoners of war.** Amer. Jour. Ophth., 1947, v. 30, pp. 165-169. (References.)

Wagener, H. P., Smith, H. L., and Nickeson, R. W. **Retrobulbar neuritis and complete heart block caused by digitalis poisoning.** Arch. of Ophth., 1946, v. 36, Oct., pp. 478-483.

Chromatopsia, frosted or snowy vision, and flickering sensations have repeatedly been described in digitalis poisoning. Retrobulbar neuritis has not previously been reported. The authors observed a man, 50 years of age, with a complete heart block as the result of digitalis intoxication. Corrected vision was 6/60 in each eye and yellow vision was noted. The fundi were normal. The field of each eye contained an 8-degree relative central scotoma. Blue was not recognized in any part of either field. The physiologic blindspots were slightly larger than normal. The vision returned to normal in about five weeks without treatment except for the withdrawal of digitalis and an increase in the amount of fluid ingested by mouth.

John C. Long.

Whitbourne, Dahlia. **Nutritional retrobulbar neuritis in children in Jamaica.** Amer. Jour. Ophth., 1947, v. 30, Feb., pp. 169-171. (References.)

12

VISUAL TRACTS AND CENTERS

Bender, M. B., and Teuber, H. L. **Ring scotoma and tubular fields; their significance in cases of head injury.** Arch. Neurol. and Psychiat., 1946, v. 56, Sept., pp. 300-326.

In the literature, ring scotoma and tubular fields have been attributed to retinitis pigmentosa, luetic chorioretinitis, myopia, glaucoma, optic neuritis, commotio retinae, migraine, nasal sinusitis, hysteria, solar retinitis, and head injuries. Many authors consider these visual defects psychogenic, even in head injuries, if the retina is normal.

The author describes a patient with head injuries, in whom extensive studies were made. He concludes that scotomas, despite their variability, have an organic basis. F. M. Crage.

Klachko, M. L. **Neuroöphthalmic syndromes in fire-arm injuries of the occipital region.** Vestnik Oft., 1945, v. 24, pts. 1-2, pp. 62-66.

The material for this analysis comprises 117 injuries to the occipital region. Fifty-two percent had hemianopsia, 11 percent concentric and other field defects, and in 36 percent the visual fields were normal. An analysis of the material and illustrative case reports lead Klachko to conclude that visual field defects and visual disturbances afford valuable diagnostic data in occipital injuries and localizing guides for the surgeon. Cortical blindness in occipital injuries is only infrequently permanent. When it lasts longer than a month it indicates an anatomic lesion in the visual centres. In injuries on a level of the external occipital protuberance hemianopsia is frequent. Heteronymous hemianopsia occurs in injuries in the midline of the occipital region. Homonymous hemianopsia is usually encountered in injuries to the lateral portion of the occipital region. Ray K. Daily.

13

EYEBALL AND ORBIT

Benford, M. C., and Brunner, H. **Involvement of the orbit in chronic inflammation of the frontal sinus.** Amer. Jour. Ophth., 1947, v. 30, March, pp. 297-308. (10 figures, references.)

Cutler, N. L. **A positive contact ball and ring implant for use after enuclea-**

tion. Arch. of Ophth., 1947, v. 37, Jan., pp. 73-81.

Twenty-two patients were operated upon. Five implants were removed. A new implant embodying a new direct method of transmission of movement is described. This implant gives to the prosthesis a larger range and greater spontaneity of movement than any previously used. The operative procedure, postoperative care, and complications are discussed.

The only two other places in the body where a similar inert material projects to the exterior are the teeth and the nails. Time will tell whether these implants will be tolerated. This preliminary report is made one year from the date of the earliest retained implantation (August 1945).

R. W. Danielson.

Damel, C. S., Marino, Héctor, and Esperne, Pedro. **Intraorbital dermoid cyst.** Arch. de Oft. de Buenos Aires, 1946, v. 21, Jan.-March, p. 24.

A case of intraorbital dermoid cyst in a 7-year-old girl is reported. The cyst was located in the floor of the orbit and communicated with the skin of the lower lid through a fistulous tract that followed incision of the mass when it was mistaken for an abscess. There was cicatricial ectropion of the lower lid. The cyst and fistulous tract were excised and the ectropion corrected later by means of a skin graft. A brief discussion of dermoid cyst of the orbit is presented. (Bibliography.)

Plinio Montalván.

Dobyns, B. **Exophthalmos and tissue changes in the guinea pig following administration of the thyroid stimulating hormone of the pituitary gland.** West. J. Surg., Obst., and Gynec., 1946, v. 54, Nov., pp. 411-427.

Following injections of the thyroid stimulating hormone (TSH), of the anterior lobe of the pituitary body, conspicuous exophthalmos occurs in guinea pigs regardless of the presence or absence of the thyroid gland or the testes. Concurrently a generalized connective tissue reaction occurs throughout the body and, at the same time, a profound change occurs in the body fat. Fat depots are rapidly depleted and replaced by edema and connective tissue. Polymorphonuclear leukocytes and macrophages participate in this reaction and appear to be phagocytizing fat. Macrophages appear to become fibroblasts which lay down connective tissue.

As further evidence of profound changes in fat following injection of TSH, great quantities of lipoid appear in the liver, kidneys, muscles, and in some epithelium and reticuloendothelial cells. Values for plasma lipoids are elevated and polymorphonuclear cells of the blood stream seem to contain increased quantities of fat.

The data suggest that, as a result of administration of TSH in quantities sufficient to produce exophthalmos, there is a generalized alteration in metabolism of fat throughout the body and that a connective tissue reaction is associated with it. Thus, many of the changes in the orbital tissue which produce exophthalmos are expressions of generalized tissue changes.

Theodore M. Shapira.

Sedan, J., and Poursines, Y. **Nontraumatic intraocular blastomycosis.** Ann. d'Ocul., 1946, v. 179, July, pp. 399-405.

A 52-year-old woman had severe exudative uveitis and hypopyon in one eye, which ultimately led to enucleation. The vitreous of the enucleated eye contained a cryptococcal type of blastomyces with characteristic buds which were adherent to the retina. Six months later the other eye was also enucleated because of a similar condition. The literature is briefly reviewed. (3 figures)

Chas. A. Bahn.

Sharkanskaya, P. I. **Chondrosarcoma of the orbit.** Vestnik Oft., 1946, v. 25, pt. 3, p. 38.

This malignant tumor originated from the roof of the orbit and extended towards the cranium in a man 56 years of age.

Ray K. Daily.

Strakhov, V. P., and Bochever, E. M. **Extraction of orbital foreign bodies.** Vestnik Oft., 1946, v. 25, pt. 3, pp. 6-9.

Seventy-four of 204 intraorbital foreign bodies were successfully extracted. In two cases the attempt at extraction failed. Each case is an individual problem, and the decision to extract the foreign body should be determined by the findings in each particular case. Three illustrative cases are reported.

Ray K. Daily.

Verzella, Mario. **Hamartoblastoma (Lymphangioendothelioma) of the orbit, simulating a tumor of the lacrimal gland.** Riv. di Oft., 1946, v. 1, May, pp. 343-353.

A woman, 58 years of age, entered the hospital with what appeared to be a tumor of her right lacrimal gland; biopsy revealed the presence of a lymphangioendothelioma, which was removed with some difficulty because of its unexpectedly large size. Photographs showing the patient before and after the operation are added, as well as five photomicrographs of the different parts of the tumor. No recurrence was observed in two years. (7 illustrations.)

K. W. Ascher.

14

EYELIDS AND LACRIMAL APPARATUS

Fox, S. A. **Some methods of lid repair and reconstruction. III. Socket reconstruction with epidermis.** Amer. Jour. Ophth., 1947, v. 30, Feb., pp. 190-196. (8 figures, references.)

Gill, W. D. **Dacryocystorhinostomy.** Amer. Jour. Ophth., 1947, v. 30, Feb., pp. 198-200.

Khurgina, E. A. **Blepharoplasty in war injuries.** Vestnik Oft., 1946, v. 25, pt. 3, pp. 31-33.

The results of 196 plastic operations on the lids after war injuries are analyzed. Free transplants were used in 89 cases, grafts with a broad pedicle in 44, grafts with a narrow pedicle in 23, and transposition of tissues in 42 cases. Transplantation of fat was used freely to fill defects, and in some cases both fat and skin were successfully grafted. Khurgina emphasizes the importance of excising all cicatricial tissue; by surrounding the graft with normal tissue the post-operative shrinking is reduced to a minimum.

Ray K. Daily.

Philips, Thygeson. **Etiology and treatment of blepharitis.** Arch. of Ophth., 1946, v. 36, Oct., pp. 445-477.

Detailed etiologic and therapeutic studies were made on 350 cases of marginal blepharitis encountered in military personnel. Only three important etiologic types could be distin-

guished in this series, namely: blepharitis due to seborrheic dermatitis, to pathogenic staphylococci and to hemophilus duplex (Morax-Axenfeld diplobacillus). There was a high incidence of mixed seborrheic and staphylococcic blepharitis. The three main etiologic types had distinct clinical characteristics and in their pure forms could be differentiated on clinical grounds alone in all but a few cases in which the staphylococcus blepharitis simulated hemophilus duplex blepharitis. Microscopic examination of scrapings from the lid margins facilitated determination of the etiologic agent. The finding of budding yeast forms, believed to be Pithrosporum ovale, was considered a diagnostic sign of seborrheic blepharitis, although its etiologic role in seborrheic dermatitis is still unsettled. Routine biomicroscopic examination of the lid margin in cases of chronic conjunctivitis revealed a high incidence of mild or subclinical blephritis, which was usually staphylococcic. It is suggested that most cases of chronic conjunctivitis have their origin in blepharitis.

Treatment was carried out with a wide variety of agents. Seborrheic blepharitis responded best to treatment that consisted of daily mechanical cleansing of the lid margins, frequent expression of the Meibomian glands, applications of 0.25 percent solution of silver nitrate to the conjunctiva and 1 percent silver nitrate to the lid margins twice weekly, applications twice daily of an ointment containing 1 percent salicylic acid and 1 percent yellow mercuric oxide to the lid margins, and treatment of associated seborrheic dermatitis of the scalp, brows, and external ears. Sulfathiazole and penicillin applied in ointment form were ineffective.

Staphylococcic blepharitis responded well to topical treatment with the following preparations, listed in order of efficacy; penicillin, sulfathiazole or sulfadiazine, and such mercurial preparations as ammoniated mercury ointment and a combination of 1 percent mercuric oxide and salicylic acid in a petrolatum base. Administration of staphylococcus toxoid proved to be an important supplementary procedure. Staphylococcic blepharitis complicated by inflammation in the Meibomian glands was much more resistant to therapy than uncomplicated blepharitis. Blepharitis due to Hemophilus duplex responded completely and rapidly to topical application of sulfathiazole ointment. John C. Long.

15
TUMORS

Amerbach, J. C., Walter, E. M., and Sperti, G. S. **Treatment of basal cell epithelioma by injection of tissue extract.** Arch. Derm. and Syph., 1946, v. 54, Aug., pp. 119-132.

The author presents a preliminary report on the treatment of basal cell epithelioma by injections of liver or spleen extract. Multiple intradermal injections produced complete regression and disappearance of the lesion in 14 cases (66 percent) and favorably affected another 6 cases or 28 percent. Control injections or procaine, which was the anaesthetic, and dextrose solution did not affect the lesions, and the extracts had no effect on normal tissue. Orwyn H. Ellis.

Bushard, W. J. **Intraocular malignant melanomas of the choroid.** Minnesota Med., 1946, v. 29, Oct., pp. 1005-1007. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

Picena, J. P., and Paez Allende, F. **Achromis choroidal melanoma.** Anales Argentinos de Oft., 1946, v. 7, April-May-June, pp. 30-47. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

Sharkanskaya, P. I. **Chondrosarcoma of the orbit.** Vestnik Oft., 1946, v. 25, pt. 3, p. 38. (See Section 13, Eyeball and orbit.)

16
INJURIES

Abramowicz, I. **Deposition of mercury in the eye.** Brit. Jour. Ophth., 1946, v. 30, Nov., pp. 696-697.

Almost nightly for 41 years a woman applied mercury ointment to her eyelids for blepharitis. For ten years she has complained of an abnormal bluish-gray coloration of her lids. Deposition of mercury was found in the skin of the lids, the conjunctiva, Descemet's membrane and in the anterior lens capsule. Treatment was without benefit. Morris Kaplan.

Bellows, John G. **Observations on 300 consecutive cases of ocular war injuries.** Amer. Jour. Ophth., 1947, v. 30, March, pp. 309-323. (8 tables, 12 figures, references.)

Doherty, W. B. **A case of a splinter of glass in the anterior chamber of four years' duration.** Amer. Jour. Ophth., 1947, v. 30, Feb., pp. 177-181. (2 figures, references.)

Doucet. **A case of disciform corneal blood staining.** Ann. d'Ocul., 1946, v. 179, April, pp. 224-231. (See Section 6, Cornea and sclera.)

Itsikson, L. E., Valuiskaya, E. N., and Plastinin, N. V. **A rare case of a large foreign body penetrating both orbits, with preservation of ocular function.** Vestnik Oft., 1945, v. 24, pt. 4, pp. 46-48.

A child, 13 years of age injured his eyes with a toy gun; when he reached the Eye Institute three months later he had a conjunctival fistula and a flat retinal detachment of the right eye, and a large nail that passed through the ethmoid labyrinth was imbedded in both orbits. After extraction of the nail, the retina became reattached, and 12 days later vision was normal in each eye. Ray K. Daily.

Krasnov, M. L. **Faulty light projection.** Vestnik Oft., 1946, v. 25, pt. 3, pp. 21-24.

On the basis of his military experience Krasnov believes that the prognostic significance of faulty light projection needs revision. Five cases are reported to show that eyes with faulty light projection are not necessarily lost. Krasnov also doubts the justification of many early enucleations for fear of sympathetic ophthalmia.

Ray K. Daily.

Loewenstein, A., and Foster, J. **A contribution to the knowledge of ocular siderosis and posterior degenerative pannus.** Amer. Jour. Ophth., 1947, v. 30, March, pp. 275-288. (15 figures, references.)

Schlaegel, T. F., Jr., **Histopathology of atomic-bomb casualties.** Amer. Jour. Ophth., 1947, v. 30, Feb., pp. 127-135. (5 figures, 2 tables, references.)

Smirnov, V. A. **A case of internal ophthalmoplegia caused by injury of the ciliary ganglion in a fire-arm ocular contusion.** Vestnik Oft., 1945, v. 25, pt. 3, pp. 42-43.

A soldier, 23 years of age, sustained an injury which led to an abscess of the right frontal lobe and encleation of the right eye. After recovery his left eye was found to have fundus changes, impaired visual acuity, and an internal ophthalmoplegia. These changes were attributed to an ocular contusion and the ophthalmoplegia is regarded as a result of a contusion of the ciliary ganglion. Ray K. Daily.

17

SYSTEMIC DISEASES AND PARASITES

Albeaux-Fernet, M., and Loublié, G. **Modern concept of the adiposogenital syndrome.** Arch. d'Opht., 1946, v. 6, no. 3, pp. 257-272.

The authors describe in detail the symptomatology of this syndrome and note the importance of differentiating it from dystrophia adiposogenitalis, essentially an incomplete form of the syndrome in which there are neither radiologic nor ophthalmologic signs and in which the obesity is generalized and not segmentary as in the complete syndrome. They differentiate the syndrome sharply from hydrolipopexia, Cushing's disease, adrenogenital syndrome, and the obesities of castration and the menopause. They conclude that errors in differential diagnosis are unfortunately frequent.

The importance of radiologic and ophthalmologic examination in every patient whose condition suggests this syndrome is stressed. The radiologic examination in a typical case with a chromophobic adenoma of the pituitary gland shows changes in the sella turcica including overall enlargement which is exaggerated in the anteroposterior diameter with modifications in the clinoid processes. Bony changes are seen in the sphenoidal sinus even earlier and more constantly. The sinus loses its normal quadrilateral shape to become triangular, the triangle's base anterior. The cases with tumors of Rathke's pouch are more easily diagnosed radiologically. In 75 percent of cases calcified nodules are seen in the tumors. These, combined with changes in the sella turcica, are highly diagnostic. Ventriculography also yields important information in cases in which other diagnostic methods are inconclusive.

The ophthalmologic examination with visual field studies is even more important than the radiologic examination. It is not only essential for diagnosis of the pituitary lesion but is the only reliable means of following the results of therapy. The characteristic eye finding is bitemporal hemianopsia but unilateral temporal field defects may occur and rarely a homonymous hemianopsia or unilateral amaurosis. Ordinarily vision is affected late as are the pupil and fundus.

The authors describe in some detail the various modifications of the syndrome and its relationship to the syndrome of Laurence-Bardet-Biedl. Etiologically they consider the pure syndrome to be due to a chromophobic adenoma or to a craniopharyngioma. With respect to treatment they discuss radiotherapy and neurosurgery and conclude that surgical intervention is now the treatment of choice to be resorted to when there are important ophthalmological changes such as bitemporal hemianopsia or signs of optic atrophy. Phillips Thygeson.

Costi, C., and Marñón, G. **Uveoparotid fever (Heerfordt's syndrome).** Arch. de la Soc. Oft. Hisp.-Amer., 1945. v. 5, Dec., pp. 1122-1129.

The authors report their observation

of Heerfordt's syndrome, characterized by bilateral uveitis, swelling of the parotid glands and low grade fever between 99 degrees and 100.5 degrees, in a woman, 49 years of age. There also was swelling of the submaxillary and lacrimal glands.

J. Wesley McKinney.

Esente, Ivan. **Photophobia with infantile acrodynia.** Riv. di Oftalm., 1946, v. 1, June, pp. 392-408.

Infantile acrodynia, also referred to as vegetative neurosis, erythroedema, trophodermatoneurosis, dermatopolyneuritis, occurs not infrequently in northern Italy. The majority of cases described in the literature had, among other manifestations, a rather severe photophobia, which also was present in five patients observed by Esente. There was no pain, and only slight lacrimation and a mild blepharospasm. Only one of his patients complained of a coexisting headache, one had a very mild conjunctival hyperemia, and none showed any corneal or uveal disease, orbital or periorbital lesion, paresthesias, or vasomotor or trophic disturbances. The acroparesthetic symptoms and the complaints of pain always preceded the photophobia, which, however, itself preceded or accompanied the appearance of mental symptoms such as insomnia, asthenia, dysuria, and emaciation. With general improvement the photophobia disappeared earlier than the diencephalic disturbances. After an extensive discussion of the pathogenesis of acrodynia and of different types of photophobia, the author concludes that in acrodynia there most probably is an alteration of the retinal metabolism that is responsible for the retinal hyperexcitability. A psychosomatic mechanism, localized in the diencephalon is profoundly altered by the disease process.

K. W. Ascher.

Esteban, Mario. **Ocular filaria.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, Dec., pp. 1097-1112.

A European girl had lived for two years in Spanish Continental Guinea. Seven years after her return to Spain she began to complain of pricking sensation of her left lower lid and something moving beneath it. A small tumor mass, which changed its shape and position was found. When the patient was operated on in novocaine anesthesia an adult female Filaria Loa was found and removed. In the specimen of blood many microfilarias of Filaria Loa were found. (6 illustrations.)

J. Wesley McKinney.

Foss, Björn. **Is there a K avitaminosis in hemorrhages after intraocular operations?** Acta Ophth., 1941, v. 19, pt. 1, pp. 15-24.

The prothrombin concentration of the blood, using Nygard's modification of Quick's method, was determined in 54 patients with cataract, glaucoma, retinal hemorrhage, thrombosis of the central retinal vein, right sided hemianopsia, iritis with hyphemia, and thrombopenia. In 12 of 48 patients there was immediate or delayed postoperative bleeding. An analysis of the prothrombin concentrations, does not indicate that a vitamin K deficiency was a factor in these hemorrhages. One patient with cataract and sprue was found to have a deficiency of prothrombin, and was given 20 mgm. of vitamin K intramuscularly before the operation; the operation was then performed without hemorrhage. (4 tables.)

Ray K. Daily.

García Miranda, A. **Ocular diabetes.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, Dec., pp. 1041-1092.

The author reviews the different effects of the diabetic process in the eye, giving the greatest importance to the retina and the crystalline lens. Statistics do not agree as to the percentage of lesions in the eyes which probably result from other causes, mainly renal or vascular diseases. (4 illustrations.)

J. Wesley McKinney.

Gordon, D. M. **Ocular sporotrichosis.** Arch. of Ophth., 1947, v. 37, Jan., pp. 56-72.

Forty-eight cases of ocular sporotrichosis have been reported in the world literature, including the case reported in this paper. Apparently in 34 of these cases the ocular disease was primary and in 15 secondary to involvement elsewhere in the body.

The cases are distributed anatomically as follows: lids, 17; conjunctiva, 10; lacrimal sac, 2; conjunctiva and lacrimal apparatus, 1; brow, 1; intraocular, 5; orbit and lids, 5; cornea, 3; limbus, 1; uveal tract (without other lesions), 1, and lacrimal canal, 1.

Of the 48 reported cases, 10 have occurred in the United States and the majority of the remainder in France. (60 references.) R. W. Danielson.

Harrington, D. O. **Ocular manifestations of psychosomatic disorders.** Jour. Amer. Med. Assoc., 1947, v. 133, March 8, pp. 669-674.

Few ophthalmologists seem to be aware of the role played by emotion in the production of discharge from the autonomic nervous system and the profound vasomotor disturbance produced. Mental conflict and emotional disturbances such as tension, anxiety, embarrassment, irritation, fear, anger, rebellion, inadequacy, insecurity, humiliation, grief, depression, despair, and excitement may be the causative factor in amauroses fugax, migraine neurocirculatory asthenia, central angiospastic retinopathy, Raynaud's disease, glaucoma, and ocular hysteria in a susceptible individual.

Irwin E. Gaynon.

Koutseff, A. **Premenopausal oculopalpebral syndrome.** Ann. d'Ocul., 1946, v. 179, July, pp. 389-398.

The complete syndrome consists of palpebral edema, ocular chemosis, vascular hypertension, ocular hypertension, concentric contraction of the fields, and transient myopia. Two cases are described. In the first patient these symptoms practically always became worse on the second day of menstruation. Following treatment with folliculine, a female sex hormone, the condition greatly improved. In the other patient, both eyes had been operated on for glaucoma; the ocular symptoms were similar to those in the first patient. The syndrome is similar to that observed in eclampsia and involves malfunction of the pituitary and adrenal glands. Chas. A. Bahn.

Krause, A. C. **Congenital encephalo-ophthalmic dysplasia.** Arch. of Ophth., 1946, v. 36, Oct., pp. 387-444.

This is a detailed presentation of a clinical entity that has been described previously in part but not as a complete syndrome. The disease is characterized by retinal and cerebral hypoplasia and hyperplasia. The ocular changes may include microphthalmos, malformations of the retina, choroid, and optic nerve, retinal dysplasia, retinal glial membranes, cones and septums and persistent remains of the hyaloid artery. Other effects are ret-

inal atrophy, gliosis, fibrosis, intraocular hemorrhages and exudates, secondary glaucoma, atrophy of the iris, anterior and posterior synechias, cyclitic membranes, choroidal and scleral atrophy, and cataracts.

The cerebral dysplasia is shown by the heterotopias and the hyperplasia, hypoplasia, and aplasia of the cerebrum and cerebellum. The secondary effects are the hydrocephalus, arising from the cerebral and arachnoidal dysplasia, and the microcephaly resulting from the cerebral and cerebellar agenesis.

Eighteen cases of this syndrome are described. The disease was more commonly found in premature infants and in single infants of a multiple birth. The common neurologic signs were mental retardation, microcephalus, and hydrocephalus. In some cases the brain showed cerebral and cerebellar hyperplasia, hypoplasia and agenesis, heterotopias, and internal hydrocephalus. Clinically, the ocular disease rarely occurred without neurologic signs of involvement of the brain when the child was examined after the age of four years. The ocular signs were loss of vision, ptosis, enophthalmos, microphthalmos, strabismus, retinal detachment, postlental masses, retinal atrophy, gliosis, recurrent retinal and vitreous hemorrhages, anterior and posterior synechias, secondary glaucoma and cataract. No method of treatment was found to prevent or to cure the disease. John C. Long.

Lauda, E. **Findings and treatment in Reiter's syndrome.** Wien. Klin. Wchnschr., 1946, v. 58, pp. 55-56. (See Section 5, Conjunctiva.)

Leoz de la Fuente, G. **Ocular pemphigus.** Arch de la Soc. Oft. Hisp.-Amer., 1945, v. 5, Dec., pp. 1113-1121.

The author reports a case of ocular pemphigus in a man, sixty years of age who showed bilateral pseudoptosis, total retraction of the conjunctiva and complete disappearance of the cul-de-sac, and photophobia without lacrimation. The patient's corneas were clear. The man had five plaques of pemphigus on the mucosa of the nose. (5 illustrations.)

J. Wesley McKinney.

Maestro, Tullio. **Polyradiculoneuritis with albumino-cytological dissociation (Guillain-Barre's syndrome) with involvement of ocular nerves.** Riv. Oto-Neuro-Oft., 1942, v. 19, May-June, pp. 153-173.

The author observed two cases of this syndrome. In one patient there was bilateral involvement of the third and sixth nerves, and unilateral facial nerve involvement; in the second patient, there was a bilateral involvement of the third and of the sixth nerve and a unilateral involvement of the fourth, the sensory portion of the fifth, and the cervical sympathetic nerve. The increase in albumin in the cerebrospinal fluid without increase of its cell content can be explained by absence of inflammation while congestion and edema are present. Therapy consisted in administration of antidiphtheria serum, artificial fever, autohemotherapy, B vitamin, salicylate of sodium, and repeated lumbar punctures. Prognosis is favorable. The first description of this syndrome was published by Guillain, Barre, and Strohl, in 1916.

K. W. Ascher.

Rubino, A. **The uveal-meningitic syndrome.** Riv. Oto-Neuro-Oft., 1946, v. 21, March-April, pp. 73-84. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

Santoni, Armando. **Tuberculous bacillemia and its importance in tuberculous infetcions of the eye.** Arch. di Ottal., 1946, v. 50, May-June, pp. 97-137.

Hemoculture according to the method of Lowenstein was carried out (often several times) in 15 patients with iridocyclitis, the tuberculous nature of which was either fairly certain or quite probable. All but one culture was negative. In four patients with iridocyclitis and in one with papilloretinitis which were almost certainly sympathetic, the cultures were negative. In two patients with tuberculosis of the conjunctiva and in one with tuberculoma of the epibulbar tissue and Pott's disease in whom the organism could be isolated from the conjunctiva, blood cultures were repeatedly negative. Cultures were also negative in one patient with sclerokeratitis associated with tuberculous arthritis of the knee, in two with retinal periphlebitis, and in several with recurrent vitreous hemorrhage, heterochromia of the iris (Fuchs type), and post-traumatic uveitis.

Although blood cultures are not a diagnostic aid and the diagnosis of tuberculous lesions of the eye must still be clinical, these results add emphasis to the theories of Lowenstein and Meller as to method of production of ocular lesions of tuberculous origin. It has been shown by Baumgarten and Weichselbaum that tubercle bacilli can be present in tissues for some time in an inactive state. It is possible that reactivation of their virulence can be brought on by the renewed presence of toxins or lowered resistance, in previously sensitized tissues. Negative cultures can also be explained on the basis of the work by Mazzetti and his collaborators who showed that the bacilli of artificially produced bacillemia disappeared in direct ratio to the resistance of the animal to the infection.

Francis P. Guida.

Talbot, H. **Ocular lesions in internees at a civilian internment camp at Hong Kong.** Brit. Jour. Ophth., 1946, v. 30, Nov., pp. 688-692.

Of 278 internees who presented themselves to the camp clinic complaining of ocular symptoms, 82 percent had appreciable contraction of the visual field. This constriction often was quite severe. Many patients had a marked pallor of the disc, and chronic conjunctivitis was very common. They complained of headache, temporary loss of vision, flickering vision, night blindness, glare, and eye strain. These signs and symptoms were unmistakably due to malnutrition and were found to be irremediable.

Morris Kaplan.

Tassman, I. S. **Ocular changes in the blood dyscrasias.** Arch. of Ophth., 1947, v. 37, Jan., pp. 42-55.

A resumé of the eye findings in these dyscrasias is given as well as case reports of erythrocytosis, pernicious anemia, and splenic anemia.

R. W. Danielson.

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Chance, Burton. **Exposure and fixation of the eye in the early days of cataract extraction.** Arch. of Ophth., 1946, v. 36, Oct., pp. 484-497.

This is an interesting paper on the early use of speculae and various fixation devices during cataract extraction. Numerous instruments are illustrated.

John C. Long.

James, R. R. **Ophthalmology in lectures of a century ago.** Brit. Jour. Ophth., 1946, v. 30, Nov., pp. 658-659.

A few ophthalmic extracts are given from a volume of lectures by Abernethy on anatomy, surgery and pathology which were published 115 years ago. Several references are made to ocular tumors and to couching of cataracts.

Morris Kaplan.

Kuhn, H. S. **Industrial ophthalmology.** Jour. Am. Med. Assoc., 1946, v. 132, Nov. 30, pp. 772-777.

The term "industrial ophthalmology" is considered obsolete, the more correct one is "occupational ophthalmology." Educational opportunities for ophthalmologists interested in this work are lacking at present but industry will demand the services of ophthalmologists.

Visual mass testing techniques are described. They are considered valuable in that important visual data such as distance and near acuity, with and without correction, distance and near phorias, distance and near stereopsis, and color appreciation are secured and recorded for each employee. The tests are not thought of as eye examinations but are placed in the category of aptitude examinations. The results guide the applicant to the proper job for him and lead others to the ophthalmologist for corrective care. The various instruments used are briefly described.

Relationship between management and the physician requires a definite understanding of what the employer can gain, as well as his responsibilities to his employees.

The author expresses an earnest desire that more ophthalmologists will become interested in occupational ophthalmology. Francis M. Crage.

Luc, Jan. **Plastic restoration of upper lid and socket.** Brit. Jour. Ophth., 1946, v. 30, Nov., pp. 665-668.

On a shrunken socket a modified Esser's plastic repair was accomplished with good result. A skin graft from the arm was folded around a dental mold and sutured into the opened socket. It healed without contracture.

Morris Kaplan.

Rutherford, C. W. **Gerontology and the eye, with some remarks on old age.** J. Indiana St. Med. Assn., 1946, v. 39, May, pp. 209-212.

The ocular characteristics of old age arise from two related processes, namely, histologic alterations in the vascular tissues, and deficiency in the fat soluble vitamins. Degenerative senile processes in the cornea, iris, lens, vitreous, retina, choroid, optic nerve, eyelids, eye muscles are described.

Several suggestions for the alleviation of ocular symptoms in senile patients are made. A brief paragraph tells what the state of Indiana is doing to help the senile patient. It is the responsibility of physicians to treat the aged patient just as much as to treat the infant or the young adult.

John B. Hitz.

Ten Doesschate, G. **Some historical notes on spectacles and on beryllus.** Brit. Jour. Ophth., 1946, v. 30, Nov., pp. 660-664.

A short discussion is presented of the origin of spectacles and their association with beryllus with which term the word spectacles is associated in many foreign languages. Beryl is a precious stone family that includes the emerald and aquamarine and through which magnification might have first been noted. In addition the beryl was

supposed to have possessed some mystic curative power. Morris Kaplan.

Velter, Edmond. **Ophthalmology and neurology in France from 1939 to 1945.** Arch. Chilenos de Oft., 1946, v. 2, Jan.-Feb., pp. 7-10.

The article, which is in French, is preceded by a full-page portrait of the author.

Very briefly the writer mentions a considerable number of literary contributions to these general fields of medicine which were presented to different societies during the war period. He comments that "the conditions created by mobilization and the occupation caused a dispersion of the hospital personnel and that of the laboratories, to which dispersion was added the impossibility of obtaining apparatus, instruments, chemical products and dyes, laboratory animals and their food. Limitations as to gas and electricity rendered impossible the functioning of a great part of the apparatus, especially incubators; and lack of heating made the institutions uninhabitable during the long winter months." W. H. Crisp.

19

ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Druault, A., and Druault, S. **The eyes of the new born.** Ann. d'Ocul., 1946, v. 179, July, pp. 375-388.

At birth the diameter of the normal eye is 17 to 18 mm. The cornea is relatively large, 9 to 10 mm. in diameter. The choroid is relatively thick and the ciliary body is not well developed. The optic nerve fibers are myelinated. The lacrimal apparatus is not well developed and a diaphragm frequently exists in the sac at birth. Crying does not occur until about the sixth week of infant life. The growth of the orbit depends upon the completeness of its contents; therefore enucleation in infancy prevents full development of the face. The weight of the eye at birth is about 2.29 grams which is one-third of that of the adult eye. At birth there is a fetal structure, the scleral protuberance of Von Ammon, which corresponds to the macula. During the eighth month of fetal life the cornea is opaque, but at birth it is entirely transparent. Descemet's membrane does not form until the sixth month after birth. At birth the sclera is bluish because it is thin and translucent. Because of the absence of epithelial pigment in the iris at birth, most children are born with blue eyes, though in some strongly pigmented races the iris may be a very dark brown. The crypts of the iris are not well formed until after the first year. The pupillary membrane of Wachendorf is absorbed during the eighth month of fetal life. Pupillary contractions occur during the fifth month of fetal life. Accurate vision is questionable until at the age of three months when the myelinization of the optic nerve is complete. The pigmentation of the suprachoroid begins at birth and is not complete for one year. The number of rods and cones does not increase with the increasing development and size of the eye. No mitoses occur in the retina after the fourth month of fetal life. The papilla of the newborn is more deeply colored than in adult life, but has the same individual differences. The lens, at birth, has about one-half the adult thickness. The posterior star is more developed than the anterior and zonular fibers are apparently more numerous than in the adult. The hyaloid artery disappears before the ninth month of fetal life. The canal of Cloquet is a condensation of vitreous tissue around the hyaloid vessels. Chas. A. Bahn.

PAN-AMERICAN NOTES

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Communications should reach the editor by the 12th of the month

III Pan-American Congress of Ophthalmology

The date of the meetings of this Congress has been advanced by the committee in Havana, Cuba, due to difficulties to obtain reservations in the hotels at a later date in the season. The meetings will be held from January 4 to 10, 1948. Arrangements are being made with travel agencies to offer transportation to Havana either by plane, or railroad and boats. To obtain reservations in hotels, members are advised to write as soon as possible to Dr. Tomas Yanes, P.O. Box 970, Havana, Cuba.

The agenda of the III Congress will be: (1) Presentation of official and of free scientific papers. (2) Sessions pertaining to research. (3) Scientific and commercial exhibits. (4) Courses of instruction. (5) Moving picture exhibits.

Official papers; that is, papers read in representation of an institution, should take not more than 20 minutes, including time for screen projections, and they should be accompanied by a summary of not more than 600 words.

Dr. Thomas D. Allen, 122 South Michigan Avenue, Chicago 3, Illinois, U.S.A., is in charge of the courses of instruction; and Dr. Gilberto Cepero, Calle L No. 353, Vedado, Habana, Cuba, of the moving picture exhibits.

Official papers should be mailed on or before August 23, 1947.

Mexican Ophthalmological Society

This society, formerly combined with the Otolaryngological Association, has separated in two different branches. New elections were held for the board of the Ophthalmological Society, with the following results: president, Dr. F. Palomino Dena; secretary, Dr. Teofilo Agundis (Lucerna, 63. Mexico D.F.). Meetings will be held monthly. The society's journal will revert to its original name: *Anales de les Sociedad Mexicana de Oftalmologia,* and will be under an editor-in-chief, Dr. M. Puig Solanes, and a large committee on publication which includes many representative members. It will appear every two months.

Association for the Prevention of Blindness in Mexico

This association will hold its third annual Scientific Week from August 11 to 16, 1947, in Mexico City. Contributions to the meeting from American ophthalmologists will be welcomed and should reach the secretary of the association, Dr. Daniel Silva (Gomez Farias 19) not later than July 10, 1947. The papers should be original, not published before, and accompanied by a short abstract.

National Institute of Ophthalmology in Mexico

An official decree of the President of the Republic has recently created a "Patronato" or board of trustees to be in charge of the building, equipment, and management of an "Instituto Nacional de Oftalmologia" which will be devoted to the treatment of patients with eye diseases, and to research work on ophthalmology and teaching, both for undergraduate and postgraduate students. The latter will be in connection with the National University of Mexico. Five members of the Patronato will be private, outstanding business and professional men and the sixth, ex officio member, will be the Secretary of Health and Public Welfare in the cabinet of the President.

The Federal Government has deeded to the trustees the necessary ground space for the construction of three units: an ophthalmological hospital of about 100 beds, an outdoor department and dispensary, and one building for research laboratories and teaching purposes. The trustees have already received the grounds and have started the foundations of the hospital. This is located near the magnificent Instituto Nacional de Cardiologia, recently opened and now in successful operation. The Institute of Ophthalmology will be of the same architectural style as the group of special hospitals near the General Hospital of Mexico City.

The trustees have already established several fellowships in ophthalmology for promising young Mexican physicians to study in this country and England for one year and then to become members of the medical staff of the Institute.

Chilean Ophthalmological Society

This society has established a postgraduate course of ophthalmology which will last two years and of which at least one year will be devoted to interneship in an ophthalmologic service. The basic subjects, anatomy, microscopic anatomy, embryology, physiology, pathology, bacteriology, and so forth, will be taught by members of the society under a director who shall be professor of the university. A certificate of attendance will be given to students taking the complete course.

V. Brazilian Congress of Ophthalmology

This congress met at the city of Salvador, Baia, from June 28, to July 2, 1946, and was presided over by the Secretary of Health and Education of Brazil. Three official subjects were presented: (1) Vision Requirements for Motor Drivers, by Dr. Pereira Gomes of Sao Paulo. (2) Abiotrophic Diseases of the Macular Region, by Prof. Jorge Malbran and Prof. Carlos S. Damel of Buenos Aires. (3) Vitamins in Ophthalmology, by Dr. Joviano Rezende, Dr. Geraldo Queiroga, and Dr. Heitor Marback. (4) Glaucoma, by Dr. Renato de Toledo, Dr. Jacques Tupinamba, and Dr. Rui Rolim. Several surgical demonstrations were held at the hospitals.

NEWS ITEMS

Edited by Donald J. Lyle, M.D.
904 Carew Tower, Cincinnati 2

News items should reach the editor by the 12th of the month

Deaths

Dr. Ross Epting Anderson, Jackson, Mississippi, died January 15, 1947, aged 48 years.

Dr. George Freiman, Brooklyn, New York, died January 3, 1947, aged 53 years.

Dr. John Marvin Ingersoll, Miami, Florida, died January 16, 1947, aged 77 years.

Dr. Thomas Otis Klingner, Springfield, Missouri, died January 7, 1947, aged 72 years.

Dr. James Orville MacDonald, New York, New York, died January 13, 1947, aged 54 years.

Dr. Edward Rodgers Neeper, Colorado Springs, Colorado, died November 21, 1946, aged 79 years.

Dr. Albert Ernest Rector, Appleton, Wisconsin, died January 13, 1947, aged 73 years.

Miscellaneous

N.S.P.B. scholarships

Nine one-year scholarships of $1,000 each have been established by the National Society for the Prevention of Blindness for students who wish to qualify themselves for work in sight conservation and the prevention of blindness. Hospitals, public and private blindness-prevention agencies, and various organizations offering medical-care programs now have positions waiting to be filled. Applications for the scholarships, which are now open, may be obtained by writing the National Society for the Prevention of Blindness, 1790 Broadway, New York 19.

Delta Gamma scholarships

Information on basic qualifications for the Delta Gamma scholarships for students interested in professional education in blindness prevention and sight conservation may be obtained from Mrs. Richard P. Miller, 39 West Jefferson Road, Pittsford, New York.

University of Glasgow meetings

During April, a series of meetings was held in the Department of Ophthalmology of the University of Glasgow, Scotland. On April 9th, Prof. W. J. B. Riddell spoke on "American Gleanings." Dr. R. Leishman was the speaker for the April 16th meeting. His subject was "Chemical Injuries of the Cornea." "Industrial Cataract" was the subject presented by Dr. J. D. Fraser on April 23rd, and on April 30th, Dr. A. Mellick spoke on "Heterophoria."

Scholarships honor Dr. Cary

At the celebration in honor of the 75th birthday of Dr. Edward Henry Cary of Dallas, Texas, the sum of $20,000 for scholarships in his name was presented to Dr. Cary by Pres. Umphrey Lee of Southern Methodist University, Dallas.

Lectures at Manhattan Hospital

During the first two weeks in April, Dr. Arthur Linksz concluded his series of lectures on "Physiological and Geometrical Optics," at the Manhattan Eye, Ear, and Throat Hospital, New York. On April 22nd, Dr. David H. Webster lectured on "Cataract Surgery." Dr. Guernsey Frey spoke on "Office Management and Routine," on April 24th. "Injuries of the Globe" was the subject of the lecture by Dr. Frank C. Keil on April 29th.

Societies

Louisiana-Mississippi meeting

The Louisiana-Mississippi Ophthalmological and Otolaryngological Society held its annual meeting at the Buena Vista Hotel, Biloxi, Mississippi, on May 5th. Dr. Peter C. Kronfeld of Chicago spoke on "Newer Trends in the Treatment of Ocular Diseases." "Allergic Problems Seen by the Ophthalmologist and Otolaryngologist," was the subject of an address by Dr. Ralph Bowen, Houston, Texas. The J. Raymond Hume Memorial Address was given by Dr. Henry L. Williams of Rochester, Minnesota, whose subject was "Meniere's Disease." Dr. Samuel Fomon, New York, spoke on "The Rhinoplastic Operation and the Restoration of Nasal Function."

Reading society attends clinics

Temple University Hospital, Philadelphia, was the March 19th meeting place for the Eye, Ear, Nose, and Throat Society of Reading, Pennsylvania. Wet and dry clinics were conducted by Dr. Matthew S. Ersner.

Speaks at Milwaukee meeting

At the regular meeting of the Milwaukee Oto-Ophthalmic Society on March 25th, Dr. Derrick Vail, professor of ophthalmology, Northwestern University Medical School, Chicago, spoke on "Some Clinical Aspects of the Blood Supply of the Optic Nerve."

Cleveland guest speaker

The guest speaker at the March dinner meeting of the Cleveland Ophthalmological Club was Dr. Thomas D. Allen, associate professor of ophthalmology at Rush Medical School, Chicago. The subject of his address was "The Value of a Complete Ophthalmological Examination."

Pennsylvania Academy meeting

Dr. William L. Benedict of the Mayo Clinic, Rochester, Minnesota, was guest of honor at the annual meeting of the Pennsylvania Academy of Ophthalmology and Otolaryngology in Harrisburg on April 26th and 27th. "Tumors of the Orbit," and "Medical Societies and Medical Education," were the subjects of the two papers given by Dr. Benedict. Dr. Francis Heed Adler of Philadelphia, spoke on "Problems in the Diagnosis and Treatment of Chronic Simple Glaucoma," and Dr. Charles Kutscher of Pittsburgh, spoke on "Contusions of the Eyeball." Other speakers were: Dr. Thomas B. McCollough, Dr. Albert P. Seltzer, and Dr. LeRoy Polvogt.

Cincinnati society revived

At its first meeting since November, 1928, the revived Cincinnati Ophthalmological Club had as guest speaker, on March 14th, Dr. A. D. Ruedemann of the Cleveland Clinic, who spoke on "Beta Radiation."

Announcements

Oxford Ophthalmological Congress

On July 3, 4, and 5, 1947, the Oxford Ophthalmological Congress will convene at the Department of Human Anatomy, Oxford. The congress will open with a discussion on "The Contracted Socket," which will be led by Prof. T. Pomfret Kilner and Mr. H. B. Stallard. The Doyne Memorial Lecture will be delivered by Prof. L. S. Stone of Yale University, and will be entitled "Return of Vision and Functional Polarization in the Retinae of Transplanted Eyes."

Examinations for technicians

American Orthoptic Council examinations will be held in September and October, 1947. Written examinations will be given in various cities on Friday, September 12th. Only those passing the written examinations will be permitted to take the oral and practical tests to be given in Chicago, October 11th. Applications on official forms must be received before July 1, 1947. Address the American Orthoptic Council, 23 East 79th Street, New York 21.

Wilder Memorial Lecture

The third William Hamlin Wilder Memorial Lecture of the Institute of Medicine of Chicago will be delivered by Dr. John Q. Griffith, Jr., Laboratory for the Study of Hypertension, Philadelphia, on Friday evening, May 23rd, at the Palmer House. His subject will be, "Rutin: A Therapy for the Hemorrhagic Complications of Hypertension."

Research Association program

The Association for Research in Ophthalmology, Inc., will convene at the Atlantic City Junior High School auditorium, Ohio and Pacific Avenues, Atlantic City, New Jersey, at 8:30 A.M. on Tuesday, June 10th. The program to be given follows:

Morning Session

(8:30 A.M. to 12 M.)

1. Bilateral Granulomatous Uveitis from the Use of Horse Serum in Rabbits.
   T. F. Schlaegel, Jr., M.D., Department of Ophthalmology, Indiana University Medical Center, Indianapolis.
2. Stimulation of Corneal Epithelization with Local Application of Erythrocytes.
   Frank W. Newell, M.D., Department of Ophthalmology, Northwestern University Medical School, Chicago.
3. The Effect of Di-isopropyl Fluorophosphate on the Capillaries of the Anterior Segment of the Eye.
   Ludwig von Sallmann, M.D., College of Physicians and Surgeons, Columbia University, New York.
4. Transfer of Ascorbic Acid and Related Compounds Across the Blood-Aqueous Barrier.
   V. Everett Kinsey, Ph.D., Howe Laboratory, Boston.
5. Acute Reversible Cataract in Chicken Due to Various Nitro-Compounds.
   Wilhelm Buschke, M.D., Wilmer Ophthalmological Institute, Baltimore.
6. Virus Studies in Lymphomatoid Disease of the Ocular Adnexa.
   Alson E. Braley, M.D., Assistant Professor of Ophthalmology, College of Physi-

cians and Surgeons, Columbia University, New York; Rose Alexander, M.S., College of Physicians and Surgeons, Columbia University, New York.

Executive Session

(1:15 P.M.)

7. Cyanide Inhibition of Corneal Respiration.
   W. A. Robbie, Ph.D., P. J. Leinfelder, M.D., T. D. Duane, M.D., University Hospitals, Iowa City, Iowa.
8. Ocular Effects of Tridione.
   Louise L. Sloan, Ph.D., Anita Peek Gilger, M.D., Wilmer Ophthalmological Intitute of Johns Hopkins Hospital, Baltimore.
9. The Reaction of Various Types of Fat Transplanted into the Orbit of Guinea Pigs Prior to the Development of Exophthalmos.
   George K. Smelzer, Ph.D., College of Physicians and Surgeons, Columbia University, New York.
10. Conjunctivitis with Membrane Formation.
    Michael J. Hogan, M.D., Division of Ophthalmology, University of California Medical School, San Francisco.
11. Studies of the Physiology of the Eye Using Tracer Substances.
    Walter S. Wilde, Ph.D., Roy S. Scholz, M.D., Dean B. Cowie, Ph.D., Carnegie Institute of Washington, Department of Embryology, Baltimore; Wilmer Ophthalmological Institute of Johns Hopkins University and Hospital, Baltimore; and Carnegie Institute of Washington, Department of Terrestrial Magnetism, Washington, D.C.
12. Observations on Pityrosporum Ovale in Seborrheic Blepharitis and Conjunctivitis.
    J. S. Gots, M.D., Phillips Thygeson, M.D.; M. Waisman, M.D., University of Pennsylvania, Philadelphia; University of California, San Francisco; and Tampa, Florida.

Reception

(5:30 P.M.)

Reception for Participants in the Program at the Marlborough-Blenheim Hotel.

PERSONALS

Dr. Frank W. Newell is now located at 30 North Michigan Avenue, Suite 1618, Chicago 2, Illinois.

Dr. Samuel M. Bloom has his offices at 121 East 60th Street, New York 22, New York.

Dr. Joseph I. Pascal of New York gave a series of lectures for the residents and internes of the Department of Ophthalmology, U. S. Naval Hospital, St. Albans, New York, during March. The subjects discussed by Dr. Pascal were: "A Study of Ocular Torsions," "Memory Aids in Physiological Optics," and "The How and Why of Cross-Cylinder Tests."

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